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DATABASE in Japan 1990

Database Promotion Center, JAPAN

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CONTENTS

I. INTRODUCTION

1. Beginning

With the passing of the 1980's, we have entered the 1990's which can be called the preparatory era for the 21st century. The "Information Society," which advanced remarkably in the 1980's, is now expected to progress much further at an accelerated pace, and databases are definitely destined to play a far more important role as a focus of the information society.

Japan's information society was no exception and advanced amazingly in the 1980's. Given the long-standing information promotion policy of the Government and Japan's rapid incorporation into international society, on-going information activities are being promoted in almost every field, such as in government, science, private enterprise as well as on an individual level.

Thus, databases have been arousing keen interest in almost all fields in recent years. Databases broadly divide into two categories, one is "commercial databases," that is, those provided by database vendors for a charge and the other is "in-house databases," which are distributed exclusively within companies, government offices, schools, etc. Both categories are attracting a great deal of attention.

Although existing commercial database services are not yet sufficiently consolidated, their users and their sales have significantly increased over the past two years. This is attributed to the increasing public interest in databases. The development of domestic databases is well under way and their provision to overseas markets is being promoted. Thus, long-standing problems of the database industry are beginning to take a favorable turn. A new movement is noted among database vendors in interconnecting their services using gateways. Additionally, an increasing number of the vendors are endeavoring to adopt new technologies such as CD-ROM, a new media. Thus the industry is quite likely to rapidly develop.

On the other hand, "in-house databases" appear to have gained the main spotlight as a result of their use for the benefit of a company's business strategy. That is, the type of in-house information system which is generally called a "Strategic Information System" has suddenly become the focus of attention in industry since the start of 1989 and the related databases are becoming noteworthy.

Interest in databases is also growing in more numerous local areas. The production and the use of databases which have so far been centralized, has started in various local regions, and local database organizations are being initiated in succession. As their transverse organization, the "Society of Database Promotion Organization" was started in 1989. Such establishments are noteworthy as databases are definitely one of the most effective means of filling local gaps and

to activate local areas.

Another geographical expansion was brought about by Japan's internationalization, as Japanese information is now in demand worldwide. However, a number of problems exist in providing domestic databases overseas. Japanese vendors have not yet gained reasonable profit for overseas market. Nonetheless, a large number of vendors, most of which are large-sized, are striving to provide as many databases as possible to overseas and their quantity is steadily increasing. In addition to commercial databases, academic databases are starting to be provided overseas on-line by National Center for Science Information System, Japan (NACSIS). Lack of information about Japan is apt to arouse overseas misunderstanding about Japan, and in this connection, vigorous overseas provision of Japanese databases should be promoted.

2. Major Growth of Domestic Databases in the 1980's

Databases are closely connected with the development of computers. The practical use of computers started in the United States in the 1950's. The original form of existing databases were created almost at same period. In the 1960's they were imported into Japan and in the beginning of the 1970's, database services started. However, such problems as high prices, the limitations of computers and their peripherals, immature communication technology and the social environments surrounding information long prevented widespread database utilization except for quite limited use by specialists.

However, majors changes occurred in the 1980's. Computers became far more efficient, personal computers appeared on the scene and computer peripherals were greatly improved. The remarkable advances in Japan's high technology industries have contributed to substantial improvement of domestic databases, others improvements, coupled with the drastic decline in computer prices also has promoted a far more rapid diffusion than was anticipated. In 1979 Nippon Telegraph and Telephone Public Corporation (the current NTT) started DDX net, and in 1980 Kokusai Denshin Denwa Co., Ltd. (KDD) started their international ICAS service, and in 1982, their Venus - P. And as a result, the environments for on-line databases were organized.

The high efficiency and the reduced cost of modems and the other communication equipment have also been achieved to a great extent, but the most important factor has been the greater need for information. In the 1980's, Japan recorded the biggest economic growth, more than any other advanced nation, and became the world's largest creditor nation. Japan's high technology has proven notably advanced, and in the latter part of the 1980's, the nation has come to be regarded as one of the most powerful countries, economically and technically. Thus, the rapidly increasing need for information expedited the production and the utilization of the databases mainly in the fields of science and business.

The Japanese database industry would have remained underdeveloped if it had not been for the progress in computers and computer related - peripherals, the improvement of the com-

munication system, and the increasing information needs of the public.

In addition to these three factors, the efforts on the part of the Government to promote the information industry should not be ignored. In 1981, the Industrial Structure Councils' Information Industry Section mapped out the "An Outlook of the Information Industry for the 1980's" and many other programs for the purpose of advancing the information society. These efforts have both directly and indirectly contributed to the progress of Japan's information society, that is, to the production, the distribution and the utilization of the databases. In 1987, the "Database Reserve Fund" was established for the purpose of discriminating favorably on the taxation of database production. This was accomplished in accordance with the proposals made by the Congressional Federation for the Promotion of Information Industry (Chairman: Mr. Tadashi Kuranari, a Diet Member). The Database Promotion Center, Japan which was established in 1984, has fostered database industry development with their own projects and contributed to the industry advancement.

As a result, an increasing number of companies have entered the database service industry and their users, their provisions and their markets have greatly expanded. Consequently, "in-house databases," that is, those of larger size and better quality information, are being produced one after another. Both commercial and in-house databases have greatly advanced, especially in the latter part of the 1980's.

3. Information Society and Databases

Japan is expected to develop into a far more advanced information society, to expand more internationally, and to have an increasingly aged population in the years to come, that is, in the 21st century. All of these factors will strongly influence our society and economy. Can databases, as a nucleus of the information society, cope with these changes?

In future database industry in Japan will be required to swiftly cope with social and economic changes and to produce the databases in accordance with the users' needs. In order to comply with these needs, the following two viewpoints will have to be considered. Initially, production and provision will have to be arranged separately for commercial, public, scientific and strategic business databases. Obviously, the commercial database industry will not be able to provide all the necessary information. For example, the existing commercial database industry will not be able to burden itself with providing all the information required for an advanced, aged population society with respect to welfare, medical care and equipment, and lifelong education needs of the aged. Such problems must be dealt with by the Government and local self-governing bodies. The production of databases related to a business strategy should be accomplished by a corporation on its own, but so far, this has been too risky. Their combined utilization with commercial databases or joint production and utilization between industry and the local areas will have to be promoted.

The second viewpoint involves the relationship between information and social structure in Japan. There are two types of information, one type of which is easily produced into a database and the other type is hard to to be so produced because of its wide social dispersal. This latter type is an obstacle to the progress of Japan internationally. All foreign countries who are eager to study our rapid progress, complain of the difficulties they experience in obtaining information about Japan and feel that it is hard to grasp the real situation of Japan. In the West, the universities usually serve as information centers and provide the needed information, whereas Japanese universities do not have this kind of service. This is not a problem that can be tackled only by databases, but is deeply related to our social and educational system. The government is urged to take some effective measures to improve this situation.

4. Problems Confronting the Japanese Database Industry

MITI's survey reports that the Japanese database service industry's sales reached ¥106.3 billion in 1988, and the Industry Structure Council of MITI is trying to estimate the future growth rate. In their "Outlook of the Information Industry for the year 2000," submitted in 1987, estimated sales were placed at ¥144.5 trillion for the entire information industry in the 2000's, and at ¥3.4 trillion for information provision services including database services.

If we estimate the sales of database services in the 2000's very roughly on the basis of ¥106.3 billion of 1988 with a tentative annual growth rate of 30%, it could be expected to reach ¥2.5 trillion.

However, in order to continue achieving rapid growth, many problems will have to be solved.

(1) Low independence

Japan's database service industry consists of over 100 competing vendors for sales of slightly more than ¥100 billion. Few of these vendors reportedly enjoy a paying business. Most of these vendors launched into this business as they expected good business prospects and placed top priority on this prospect, and a lower priority on profitability.

(2) Structural immaturities of the industry

Nearly half of Japanese vendors both produce databases and sell their own products. Namely, they are producers and distributors. When database users were specialists only, the friendship between the vendors and the users helped to produce handcrafted databases. However, because of the increasing numbers of users, their needs have been diversified and "one-stop shopping" type of database services are increasingly needed.

Large-scale vendors have taken over a number of databases and aim at developing comprehensive database services. Consequently, in the future, a clear distinction between vendors in relation to the type of database services business they pursue is expected to arise.

(3) Intensification and diversification of information contents

The commercial databases available in Japan have increased rapidly over recent years. However, as much as 73% of the databases are produced overseas, mainly in the United States. The reason why domestically produced databases are not provided to the extent as might be expected, can be attributed to the considerable cost and time needed to produce them. A number of vendors have failed to obtain sufficient profit for their investment.

One of the most effective methods for increasing database users is to create a new type of services. Prior investment is essential for any type of business. If it is neglected and a business is kept afloat only by existing products, sales will never increase. Therefore, the Japanese database industry must to make further efforts. In the United States, transaction services are increasing. This type of services embodies both databases and processing. Also in Japan, this type of service is expected to develop in the very near future.

(4) Dealing with technological innovation

Databases developed originally from the combination of computers and communication technology, and their related technologies cover diverse fields. Moreover, the speed of their progress has been amazing. The tendency exists that in-house database operations are more advanced, and so, the database service industry as a whole will have to keep alert to technological innovation and make every possible effort to adopt new technologies in order to maintain user patronage.

(5) Fostering database specialists

Improvements in commercial database services are needed both overseas and at home but also in-house databases are being produced in succession. The production of local databases are urgently required as they are essential for a local information society. To achieve these, specialists in the production and operation of the databases are indispensable. MITI is now debating whether to set up a state examination for a national license for database production as one of their examinations pertaining to information processing specialists. Such procedure could surely be expected to encourage prospective database specialists. With respect to database searching, private examinations are being given, but a systematic curriculum is required to develop database specialists.

5. Internationalization and Database

Internationalization has long meant that Japan exports its products worldwide and imports information from all over the world. This concept was obliged to change in the latter part of the 1980's, when the imports of overseas products and the overseas provision of our information began to be expedited. In order to have nations overseas understand our country fully and correctly, the overseas provision of Japanese information is of vital importance. In recent years, the overseas provision of Japanese produced databases is increasing, but the number amounts to

only 155 databases, as compared with 1,466 imported databases. This is to be expected as the total number of Japanese produced databases amounts to 662 only. This clearly shows that improvements in the provision of domestic databases are urgently needed.

In providing domestic databases overseas, many problems and obstacles exist such as organizing servicing systems in local areas, communication circuits, operation costs, translation into English, and so on. Regrettably, few Japanese database vendors are sufficiently strong to overcome these obstacles. Thus, Japanese database vendors should at least engage, for the time being, only in the production of the databases and leave the distribution and the sales to overseas distributors. In such case, Japanese databases will have to be attractive in every respect to the overseas distributors.

As the actual numbers of Japanese overseas provision are limited, the Government is required to urgently establish some kind of organization to provide consultation on Japanese information and to make every possible effort to promote overseas provision of Japanese information.

II. PRESENT SITUATION OF COMMERCIAL DATABASES IN JAPAN

1. Positioning of the Database Service Industry

1.1 Definition and Classification of Database

The term "database" dates back to the 1950s when the U.S. Department of Defense (DOD) generated a library for global and concentrated management of information on military capabilities including personnel and arms by utilizing computers. Reportedly, this library came to be referred to as a database in the sense that it was a base of data.

Although the term "database" has taken root in Japan over the years, no standardized definition or scope of a database exists. Database understanding is also diversified internationally, and a coordination study has been started by the OECD (Organization for Economic Cooperation and Development).

In Japan, the Copyright Law was modified in 1986 to include databases under its protection as intellectual property. This Law defines a database as "a set of articles, numerical values, graphics, and other such data that are systematically arranged so that they can be easily retrieved by computers."

In addition to stored information, flow-type information such as financial and securities information is also generally considered a database when the flow is via a computer network. Also, utilization of this kind of information is increasing rapidly because it is available in real time.

Databases can be classified also from the following viewpoints: (1) Data type, (2) Subjects, (3) Supply mode, and (4) Application.

The first classification by data type is based on the data attribute, that is, whether the information for the database is character, numerical values or graphics. According to this kind of classification, a database can be broadly divided into (1) Reference type and (2) Fact type. The former provides guidance information for original literature (bibliographies or abstracts) while the latter provides original information itself (full text information or statistical data).

According to the second classification there are broadly four subjects including (1) General, (2) Business, (3) Natural science, and (4) Social and Cultural sciences. Unlike the early period of database generation when the reference type for natural sciences was paramount, the fact type for business use is now the mainstream.

The third classification by supply mode includes (1) On-line and (2) Off-line (batch). When database services were started, sales using magnetic tape (i.e., batch service) predominated. Subsequently, together with increasing needs for immediate availability of information and growing telecommunication services, on-line services have come to play a leading role.

Recently, the growth of stand-alone type databases is expected to affirm that database supply by means of CD-ROM is being highlighted. Currently, the coexistence of on-line and batch services is noted.

The fourth classification by application broadly includes (1) Commercial databases and (2) In-house databases. The former is a database which is made publicly available for a fee, and representative of the latter are in-house (in-business) and industrial databases.

This section introduces trends in commercial database services.

1.2 Part of the Information Industry

Database services are part of the information industry. The Industrial Structure Council (an advisory organization to the Minister of International Trade and Industry) defines the information industry as comprising (1) Electronics industry, (2) Telecommunications, and (3) Information services. The information service industry in turn consists of (1) Information processing services, (2) Software services, and (3) Database services. That is, the database industry may be said to be one of the three pillars of the information service industry.

The term "information industry" was first introduced to Japan in the latter half of the 1960s, but the scope of the information industry is considered vary greatly. The same applies to database services and there exists no internationally accepted classification. In France, for example, the size of the database market is calculated by including videotex. In any case, this industry is directly facing the impact of technology fusion or media fusion. CD-ROM now being introduced as a new database media is a good example. Wireless supply of stock price information has also been started. In this situation, database service patterns are increasingly diversified and database positioning in the information industry is becoming increasingly important.

2. Market Size of the Database Service Industry

MITI released the "Survey on Designated Service Industry," containing official statistics concerning the market size of the database industry in Japan. According to the section titled the "Information Industry Service Industry" of the above Survey published in December 1989, the annual sales of the information service industry as a whole were ¥3,297.3 billion as of November, 1988.

The ¥2,000 billion level was first exceeded in the previous survey and within the short period of only one year, sales increased to over ¥3,000 billion. This indicates the extent of the growth of the information service industry as part of the information industry.

With regard to database services, sales outlets numbered 269, and gross sales achieved ¥106.311 billion (Table 2-1). Currently, gross sales have been broken down by various categories. Thus, sales of on-line database services registered ¥70.7 billion (66.5%), and in terms of

domestic or foreign, domestic database services recorded sales of ¥101.4 billion, occupying an overwhelming 95.4%.

By actual subjects, database sales were 63.8% for business, 22.5% for science and technology, 2.5% for general, 0.9% for social and cultural sciences, and 10.3% for others.

The survey this year involved a review of the business classification, etc. That is, information supply service was renamed as database services and a breakdown into domestic or foreign - made service was accomplished for the first time. From this standpoint, the database sales noted in the 1987 survey, which were ¥43.2 billion, showed considerable sluggishness when compared with ¥114.3 billion of 1986. Thus, the prominent growth rate in database sales as high as 246% over the prior year relative to other sectors should, therefore, be read in this context. Conversely, it may be said that statistically database sales are regaining stability within only one year.

Table 2-1 Annual Sales by Various Sectors of Information Service

(Unit : Million yen)

Classitication		Total	Trusted computation	Software development & Programming	Data input such as key punching	Machine time sale	Trusted system management and operation	Database Service	Various Researches	Others
Annual sales	1984	460,241 (100.0)	154,677 (33.6)	88,973 (19.3)	60,987 (13.3)	12,007 (2.6)	66,521 (14.5)	27,069 (5.9)	31,540 (6.9)	18,466 (4.0)
	1985	1,095,301 (100.0)	315,606 (28.8)	364,377 (33.3)	100,550 (9.2)	15,694 (1.4)	102,511 (9.4)	78,713 (7.2)	58,485 (5.3)	59,365 (5.4)
	1986	1,915,939 (100.0)	427,826 (22.3)	912,747 (47.6)	120,324 (6.3)	12,073 (0.6)	144,323 (7.5)	114,306 (6.0)	72,989 (3.8)	111,352 (5.8)
	1987	2,299,305 (100.0)	501,206 (21.8)	1,104,504 (48.0)	118,740 (5.2)	22,493 (1.0)	115,766 (5.0)	43,237 (1.9)	99,313 (4.3)	294,048 (12.8)
	1988	3,297,341 (100.0)	635,113 (19.3)	1,799,131 (54.6)	163,723 (5.0)	24,694 (0.7)	171,679 (5.2)	106,311 (3.2)	150,585 (4.6)	246,105 (7.5)
Increase or decrease(%)	Yearly average of 1978～1983	18.9	15.3	32.6	10.5	5.5	9.0	23.8	13.1	26.3
	Yearly average of 1983～1988	24.7	15.0	37.6	10.2	9.5	10.9	6.2	20.8	32.9
	Comparison with previous year	143.4	126.7	162.9	137.9	109.8	148.3	245.9	151.6	83.7
Ratio 1988/1978		7.2	4.1	20.2	2.7	2.1	2.6	3.9	4.8	13.3

Note : "Various Researches" in this survey means market researches, public opinion poll and think tank study, etc. The various researches other than market researches and think tank, however, were included in "Others" in case of 1987 only.

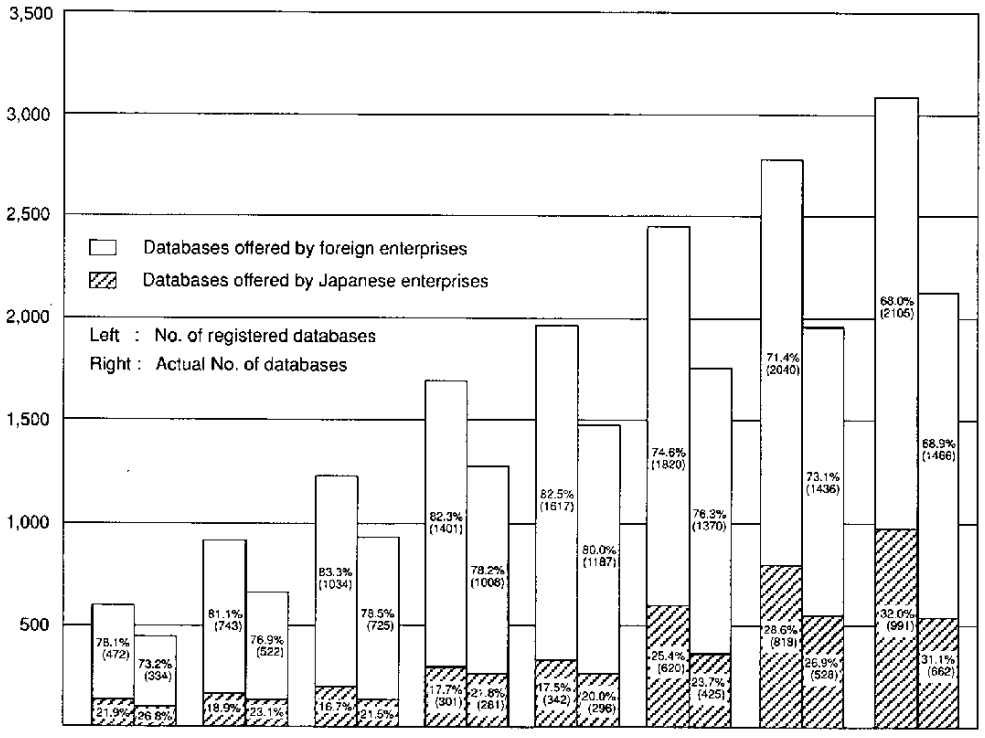
Source : "Survey on Designated Services Industries," MITI, December, 1989.

3. Spread of Database

The spread state of databases in Japan can be noted from the "Database Directory" issued by MITI. This Directory has been summarily issued since 1982 as a guidebook introducing the content of databases available in Japan.

3.1 Steady Increase in Number of Databases

According to the 1989 version of the Database Directory, the number of registered databases available in Japan was 3,096, with 2,128 being the actual number. The number of registered databases represented the number determined by counting the number of databases submitted for registration by database service enterprises. However, the same database was often submitted for registration by multiple enterprises. The actual number noted above was obtained by deducting from the number of registered databases the resulting overlap. The actual number of databases is over the order of 2,000, which is 4.7 times the number (456) in 1982. Note that the Directory includes not only on-line databases, but also off-line databases such as magnetic tapes and CD-ROMs (Figure 2-1).



	Fiscal 1982	Fiscal 1983	Fiscal 1984	Fiscal 1985	Fical 1986	Fiscal 1987	Fiscal 1988	Fiscal 1989
No. of Registered Databases	604	916	1,242	1,702	1,959	2,440	2,858	3,096
Actual No. of Databases	456	679	924	1,289	1,483	1,795	1,964	2,128
No. of Registered Enterprises	42	58	75	100	121	137	194	211

Figure 2-1 Databases Accessible in Japan

Source: "Database Directory," MITI

3.2 Slight Increase in Domestic Databases

Most databases currently in the market are foreign made, and provided mainly by the U.S. There are nearly 4,000 on-line databases in the U.S., and most of these are accessible via telecommunication networks from Japan. Practically, foreign - made databases account for 80% of the actual databases in the 1986 Directory.

More recently, the ratio of domestic databases has been on an upward trend, that is, from 26.9% in 1988 to 31.1% in 1989. Considering the substantial time required to develop a database, it can be stated that the build-up of domestic databases has now taken hold.

From the standpoint of funds spent for database utilization, domestic databases now predominate. For example, according to the "Survey on User Awareness of Database Services" executed in March 1990 by the Database Promotion Center (DPC), the percentage of amount spent for database utilization in 1988 was 66% for domestic databases and 34% for foreign - made databases. The Survey also shows that the domestic ratio (i.e., the percentage of Japanese database vendor sales of the total database sales) was 84.2%, far higher than the sales ratio of foreign - made databases.

3.3 Distribution of Databases by Subjects

Among the database subjects currently available in Japan, "business" occupies the highest percentage of 41.4%, with "natural science and technology" at 29.7% and "general" at 24.8% (all on the basis of actual figures).

Let us see foreign and domestic - made databases for each subject (see Figures. 2-2 (2) and (3)). As of 1989, the number of databases currently in the market is 2,128. Of these databases, domestic - made databases are 662 (31.2% of the whole) while foreign - made are 1,466 (68.8%).

Databases in the "business" subject are more than half (54.4%) in domestic - made databases. Databases in this subject cover the entire subjects of economy, including macro economical statistics (16.9%), such as industries and trades as well as statistics of national income, financial conditions and activities of corporation (11.3%), financing/securities/stock exchanges (10.6%), and marketing/merchandise (5.7%). Moreover, the data renewal frequency of these databases is high and the users' utilization frequency high also. This is followed by the "general" subject at 27.9% including newspaper and magazine article databases (9.2%) and personnel and organizational (4.5%), and by the "natural science and technologies" subject at 14.7%.

On the other hand, for imported foreign - made databases, the "natural science and technologies" subject occupies the highest percentage at 36.4%, including medical and pharmaceutical sciences (6.7%), chemistry (5.9%), electricity and electronics (5.3%), and patent (3.3%). The "business" subject, which holds the highest share for domestic - made databases, has the percentage at 35.5% while the "general" occupies the percentage of 23.5%.

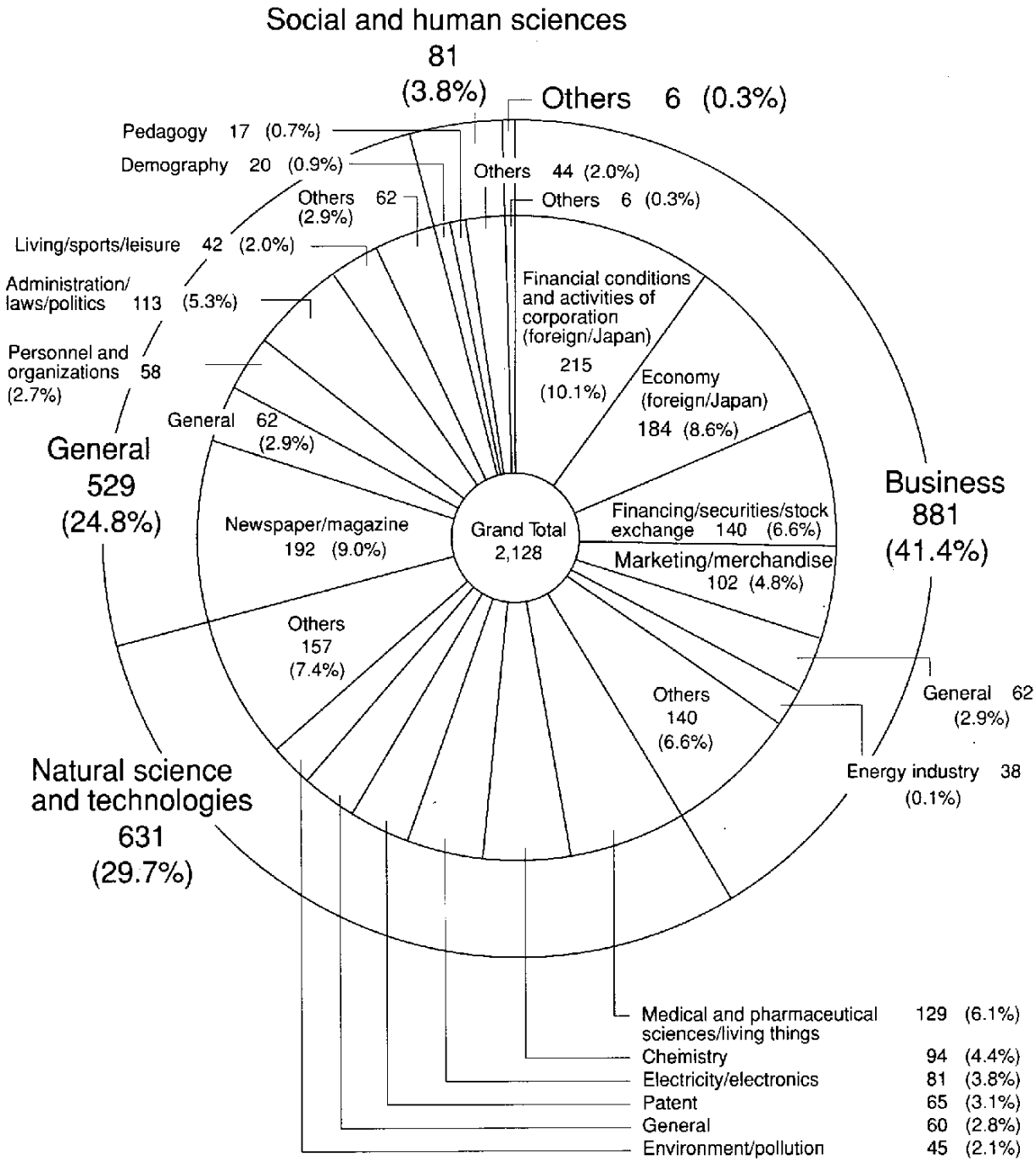


Figure 2-2 (1) Distribution of Domestic and Foreign Databases by Subject

Source : "Database Directory, " MITI, 1989

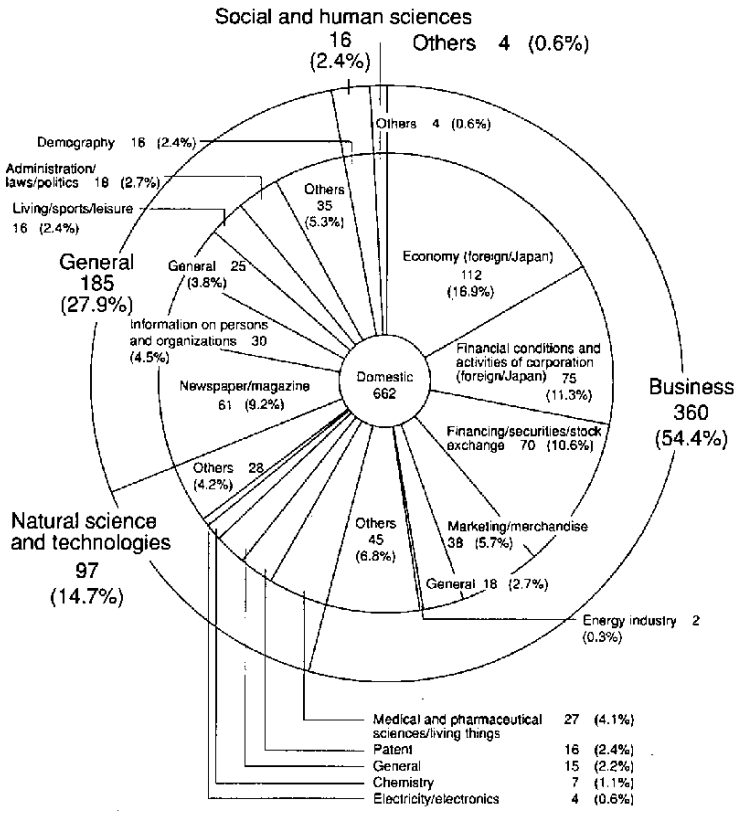


Figure 2-2 (2) Distribution of Domestic and Foreign Databases by Subject

Source : "Database Directory, " MITI, 1989

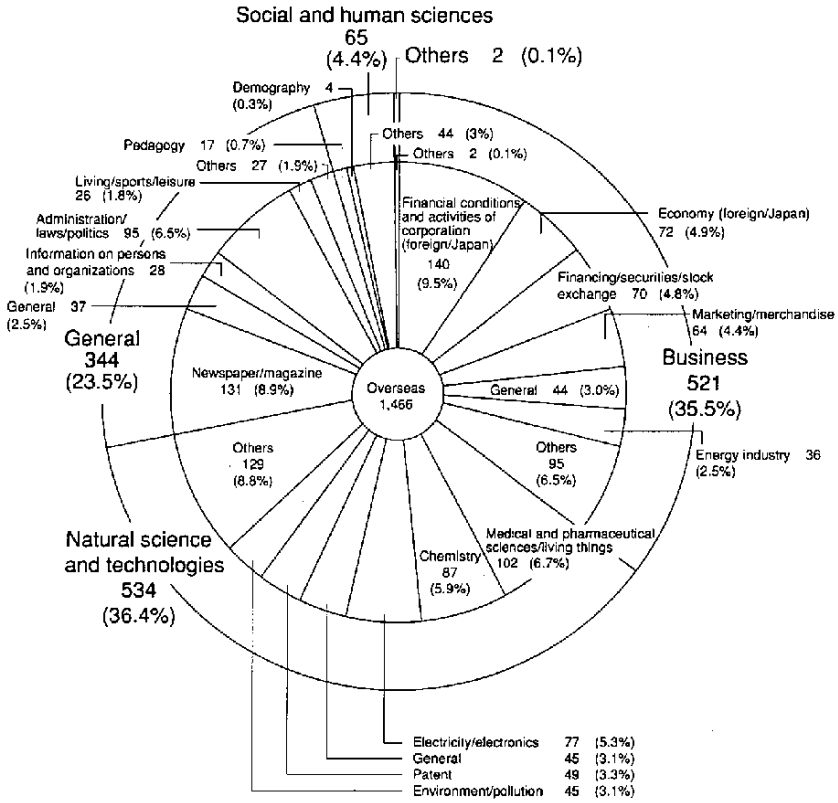


Figure 2-2 (3) Distribution of Domestic and Foreign Databases by Subject

Source : "Database Directory, " MITI, 1989

4. Comparison between Japanese and American Databases

No internationally coordinated information in reference to databases exists, and a Japan-U.S. comparison in the strict sense of the word is not possible. Still, comparison with the U.S., an advanced country in this subject, will better help in understanding of the database situation in Japan.

In this section, comparison will be made by using (1) number of entry enterprises and the number of passwords (which are related to the scale of the database users) and (2) number of businesses or fact databases which is related to the type of database as indexes.

First, a considerable gap exists between Japan and the U.S. in terms of scale. According to "On-line Database Directory" of Cuadra, the number of entry enterprises in the U.S. approach 2,300 including producers and on-line distributors. Though not exactly determined, the number of database enterprises in Japan may be estimated at 230, at the maximum, based on the 194 listed in the Database Directory. This means a difference of greater than one order of magnitude between Japan and the U.S.

With respect to the number of passwords (a barometer to measure the number of users), the IDP Report shows 2.4 million as of January, 1989 in the U.S. In Japan, on the other hand, there were 0.14 million as of the same period according to "Nikkei New Media." A considerable difference in the sales volume of databases exists as well. According to a report of the U.S. Department of Commerce, the sales amount was $6.2 billion at the end of 1988. In contrast the "Survey on Designated Service Industries" of Japan, shows a sales volume of ¥106 billion ($730 million with 1$ = ¥145) for the same period.

A key factor in the database service industry is the number of producers. There are 1,000 producers in the U.S. according to Cuadra, while there are only 110 producers in Japan, including those who are also working for other services. Since the number of producers is said to indicate the potential power of the database industry, it is obvious that the gap between Japan and the U.S. is considerably wide. Of course, some observes point out that a simple comparison of two countries differing in database history and background is not of great significance. Nevertheless, the difference between the two countries is still remarkable even if the comparison is made by reducing the numerical values of the U.S. by half (as the U.S. population is twice that of Japan).

With respect to the number of databases available and their content, there is no marked difference between the two countries. In one sense, this is quite natural when considering that more than 70% of the databases now available in Japan are foreign made (U.S. mainly). The number of databases is 2,900 in Japan and 3,700 in the U.S. That is, the number of business databases and the number of fact databases in Japan are respectively 1,300 and 1,800, and the corresponding figures for the U.S. are 1,700 and 2,200, respectively.

The database situation in Japan and the U.S. is shown for reference in Figure 2-3 as a comparison. In this graph, U.S. data are shown outside in the form of a constant frame while the data on Japan are shown inside by proportionally distributing the data according to the circumstances

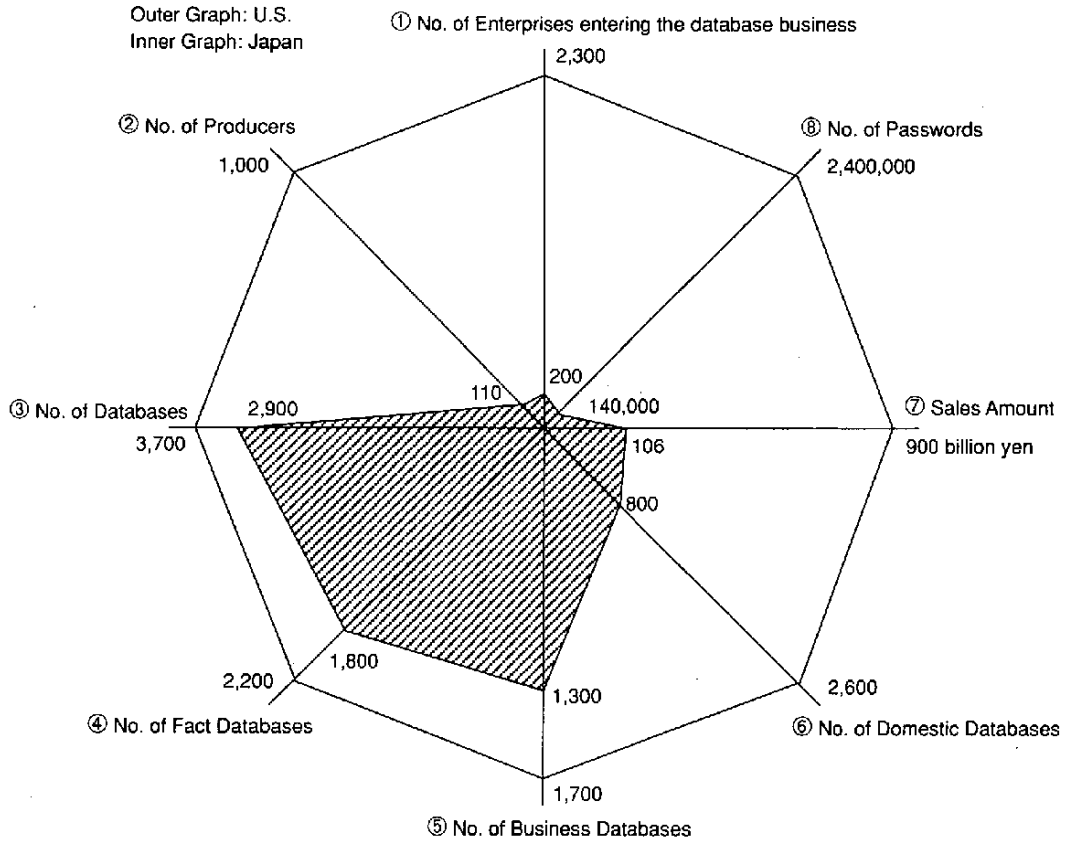


Figure 2-3 Comparison between Japanese and U.S. Databases (1988)

Sources: ① ~ ⑥ Cuadra, On-Line DB Directory for the U.S.
"Database Directory" by MITI for Japan

⑦ Estimated from data obtained from the U.S. Department of Commerce and LINK Resources for the U.S., and from Current Survey on Designated Services Industries for Japan. (1$ = ¥145)

⑧ Nikkei BP, "Nikkei New Media"

5. Structure of Database Service Industry

5.1 Data Distribution Mechanism

Database services are comprised by a wide variety of enterprises. Consider, for example, the process from the source of information generation to delivery of database information to users. First, there are enterprises and organizations which generate information for database production, such as magazine publishing or generation of statistical data. Such information is the base used to create a database, and is called source data.

Then, there are enterprises which actually create databases from information. These are enterprises called "producers" and they hold a key position in the distribution of databases.

Databases thus created are offered to users by such distributors.

There are also agencies which undertake user acquisition and after-sale care of databases (including overseas databases) for producers and distributors. There are also information brokers which perform database searches or consulting in response to user request.

Among these enterprises, those directly committed to database distribution, such as (1) producers, (2) distributors, (3) information brokers, and (4) agencies, are called database service enterprises. One enterprise often performs several of these business functions.

The U.S. database distribution mechanism shows definite specialization. That is, producers engage in production of databases only while distributors dedicate themselves to the supply of databases without production. In contrast, in Japan, one enterprise frequently offers additional services.

Of the 211 enterprises which applied for registration in the database directory in 1989, as many as 68 are "producers and distributors." In regards to dedication to one service only, there are 49 specialized information brokers, but only 25 specialized producers and only 15 specialized distributors. That is, 54% of all database service enterprises offer additional service in one some manner (Table 2-2).

In such service enterprises, the producer holds the prime position in the database distribution mechanism and thus is an important factor. Data in large amount or a highly developed supply function is meaningless if there is no database. Thus, the number of producers is a barometer to indicate the latent energy of database services.

Table 2-2 Comparison of Database Services

Service	Enterprises registered in database diredtory		DPC Survey of Awareness-Vendor	
	No. of enterprises	Distribution ratio	No. of enterprises	Distribution ratio
Specialized producer	25	11.8%	30	22.2%
Specialized distributor	15	7.1	14	10.4
Specialized infomation broker	49	23.2	15	11.1
Specialized agency	8	3.8	3	2.2
Producer and distributor	68	32.2	35	25.9
Producer and distributor and agency	6	2.8	9	6.7
Producer and infomation br oker	4	1.9	7	5.2
Others	36	17.1	22	16.3
Total	211	100.0	135	100.0

Source: "Database Directory," MITI 1989
"Survey of User Awareness of Database Services - Vendors," DPC, March 1990

5.2 Market Entry

There is no accurate data concerning how many enterprises have entered the database service market. According to the number of enterprises applying for registration in the database directory, there were 211 in 1989.

With respect to the time of entry into the database business, a peak occurred around 1985. According to the "Survey of User Awareness of Database Services - Vendor" (1989) by the Database Promotion Center, 37 (27%) of 135 database enterprises responding to the survey entered before 1980. This indicates that the remaining 100 enterprises entered during the past decade.

As many as 23 enterprises entered the market in 1985 and 17 in 1986. Thus nearly one third of the enterprises appeared in the market during only these two years. The same result was obtained for producers (specialized and non-specialized). That is, among the 90 enterprises responding to the survey, 28 (31%) were those that had started before 1980, while as many as 26 (29%) started in 1985 and 1986 (Table 2-3).

Table 2-3 Time of Entering the Database Business

	Year of entry	Before 1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990 (expecting)
No. of enterprises entering the database business (N=135)	No. of entering enterprises	37	6	6	6	12	23	17	10	12	4	2
	Cumulative rate	27.4%	31.9	36.3	40.7	49.6	66.7	79.3	86.7	95.6	98.5	100.0
Producers (N=90)	No. of entering enterprises	28	5	4	3	8	12	14	3	9	3	1
	Cumulative rate	31.1	36.7	41.1	44.4	53.3	66.7	82.2	85.6	95.6	98.9	100.0

NOTE: If the same enterprise entered two or more database service functions at different times, only the earlier entry is counted.

Source: "Survey of User Awareness of Database Services - Vendors," DPC, March 1990

As described previously, the period around 1985 was the time when (1) the database subject became a business mainstream, (2) fact type database became the governing type of database, and (3) numerous proposals and responses were made for promotion. That is, database interest suddenly rose during that period. This trend is supported by the number of enterprises operating databases.

Only a few database service enterprises are able to conduct a business using databases only. That is, most database service enterprises have another principal business. Thus enterprises from very diversified industries are entering the database business.

What categories of industry make up the database service business? The distribution of the industrial category among member enterprises (107 as of end of 1989) of the Japan Database Industry Association, an organization of database businesses, shows that 27 enterpris-

es are engaged in "information supply service" (substantially specializing in databases), which accounts for 25% of the whole. The remaining three-fourths of the enterprises handled "information" in various ways.

Enterprises occupying high percentages are (1) think tanks, (2) information processing and software enterprises, (3) printing and publishing, and (4) newspapers. There are also entries from communication and trading companies. In any case, they are highly committed to "information" in daily business (Figure 2-4).

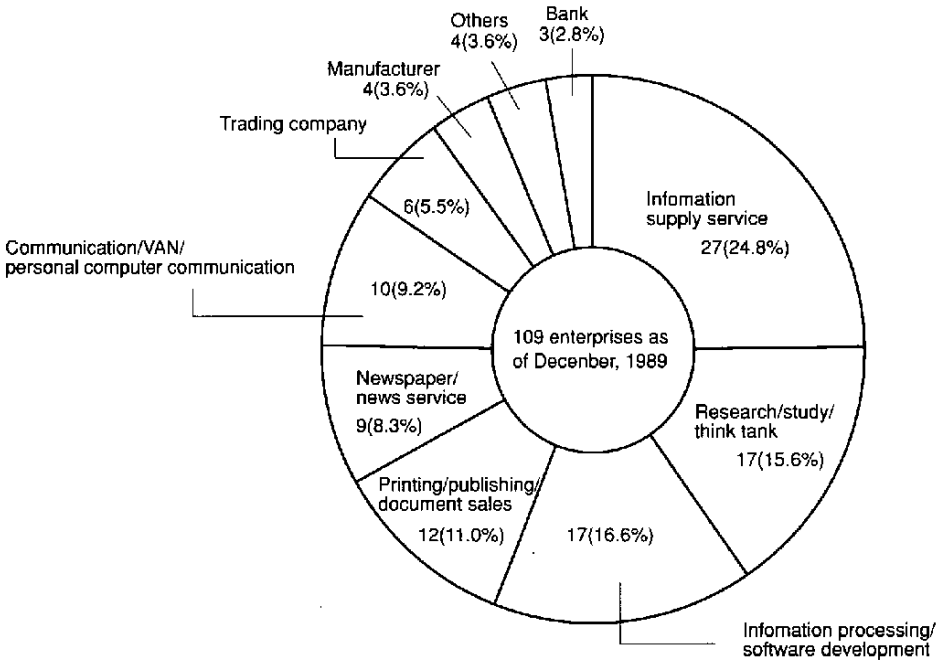


Figure 2-4 Distribution of the Industrial Category of Database Service Enterprises

Source: Japan Database Industry Association

6. Present Situation of Database Service Industry

Since 1984, the Database Promotion Center (DPC) has been publishing the "Survey of User Awareness of Database Services" to understand the present state of database users and vendors. In the latest survey, the questionnaire was sent to 2,591 enterprises in September 1989, with effective responses returned from 731 enterprises for "Users" and 135 enterprises for "Vendors."

6.1 Outline of Respondent Enterprises

Looking at the database service type of the 135 respondent enterprises, it is noted that producers and distributors are the largest at 35 (25.9%), followed by producers (22.2%), information brokers (11.1%), and distributors (10.4%) (Figure 2-5).

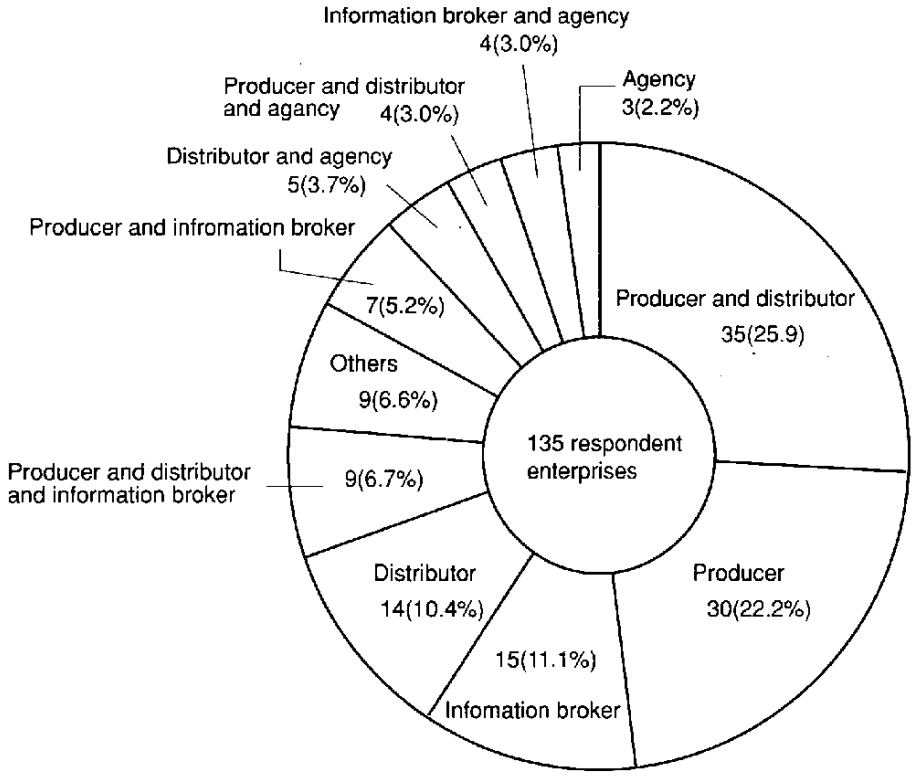


Figure 2-5 Distribution of Service Type for Respondent Enterprises

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

This survey on vendors is now the third survey and the number of respondent enterprises has increased from 90 and 104 to 135. Do these enterprises consider database services their principal business? Among 134 responding enterprises, 33.6% currently positioned databases as the principal activity. This is only a slight increase from the previous percentage of 32%, and still it remains only one-third of the whole. For the future, 49% of all enterprises are expected to position this service as the principal activity (Figure 2-6).

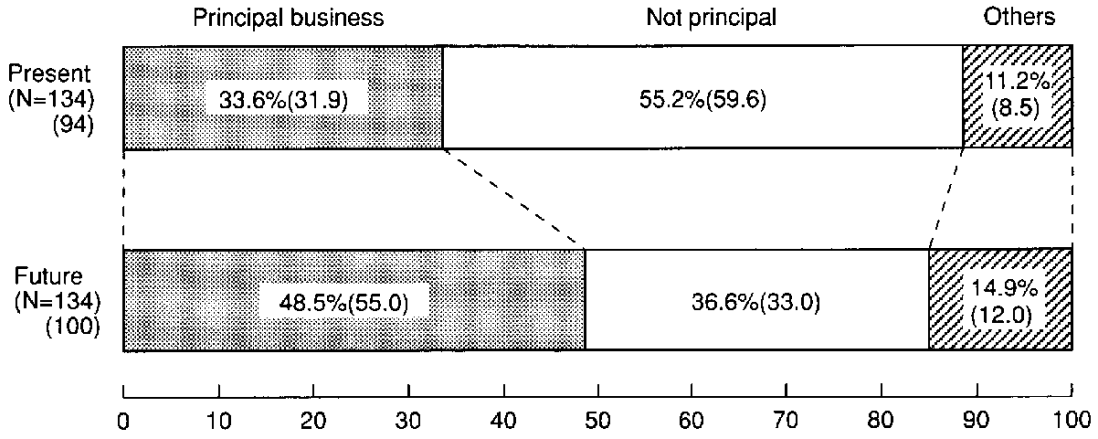


Figure 2-6 Positioning of Database

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

By service type, information broker and agency is ranked top, and 50% of enterprises responding indicated function as the principal activity. Other types which exceed the overall average (33.6%) are producer and information broker, and producer and distributor (Figure 2-7).

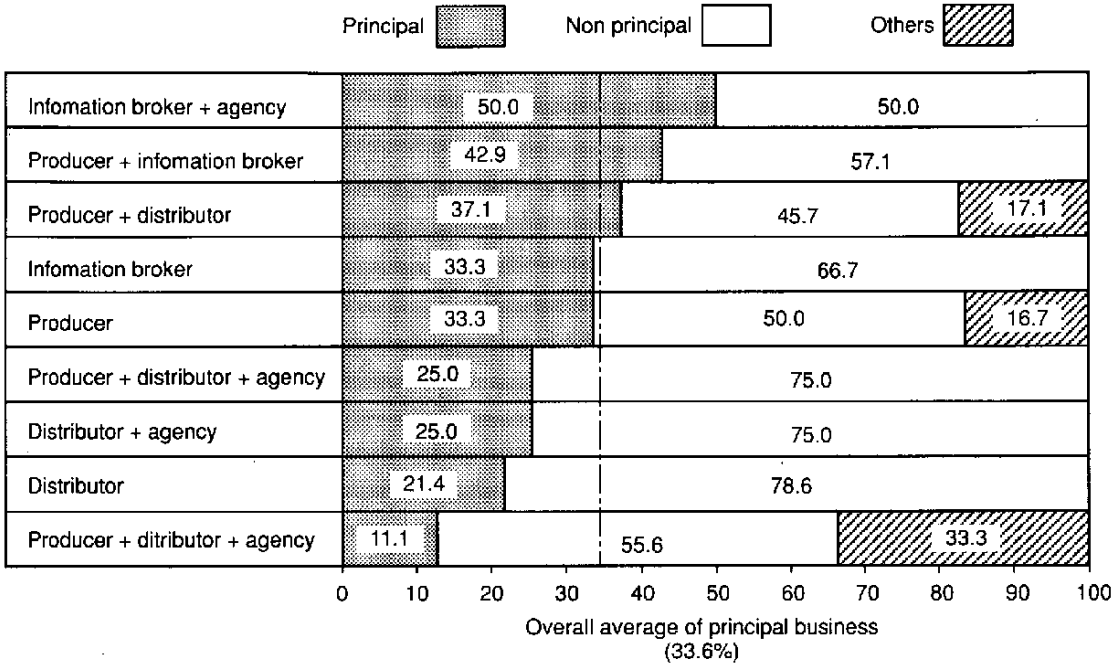


Figure 2-7 Present Positioning of Database Service

NOTE: Analyzed for four or more responses

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

For future positioning, information broker and agency is forecast first (75%) as in the present situation. Similarly, 75% of producer and distributor, and agency, position database services as the principal activity. As this industrial category has a percentage as low as 25% for positioning of database service as a principal activity, the future expectation is considered to be extremely high (Figure 2-8).

6.2 Sales Amount of Database Service

The sales amount of database service is analyzed here in terms of the following four indices:

(1) Sales amount of database by gross sales of an enterprise (Specialization ratio)

(2) Future growth rate of database sales amount (Growth rate)

(3) Domestic database ratio in database sales amount (Domestic sales ratio)

(4) On-line ratio in database sales amount (On-line ratio)

For the first index, the overall average of respondent enterprises (88) is 21.6%. The transition for the past three years shows an upward trend: 11.1% in 1987, 17.7% in 1988, and 21.6% in 1989. Various industrial categories have entered the database service business and its history is short. Thus, the ratio of the gross sales amount is still small. But an upward trend can be noted.

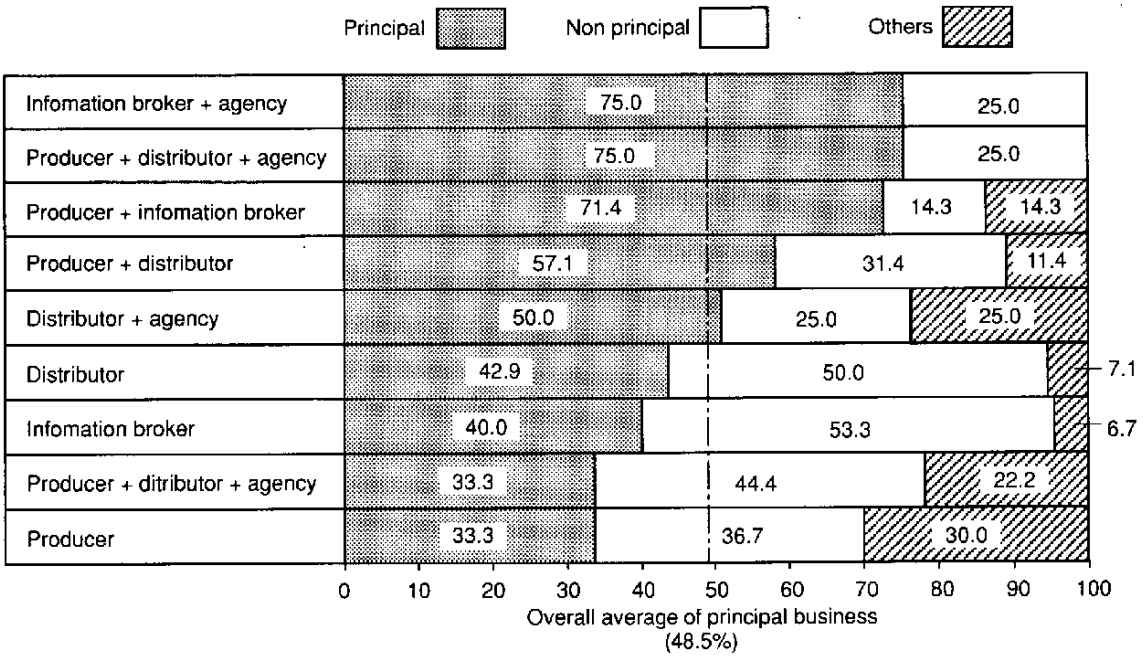


Figure 2-8 Future Positioning of Database Service

NOTE: Analyzed for four or more responses

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

Now, the second index. That is, the annual average growth rate (predicted) of database service sales amount for the coming five years. The average value of 93 responding enterprises is high at 32.3%. This value is considered to contain considerable expectation in addition to positioning as a principal business. High percentages were obtained from distributor and agency (77.3%), producer and distributor (39.3%), and distributor (33.0%) (Figure 2-9).

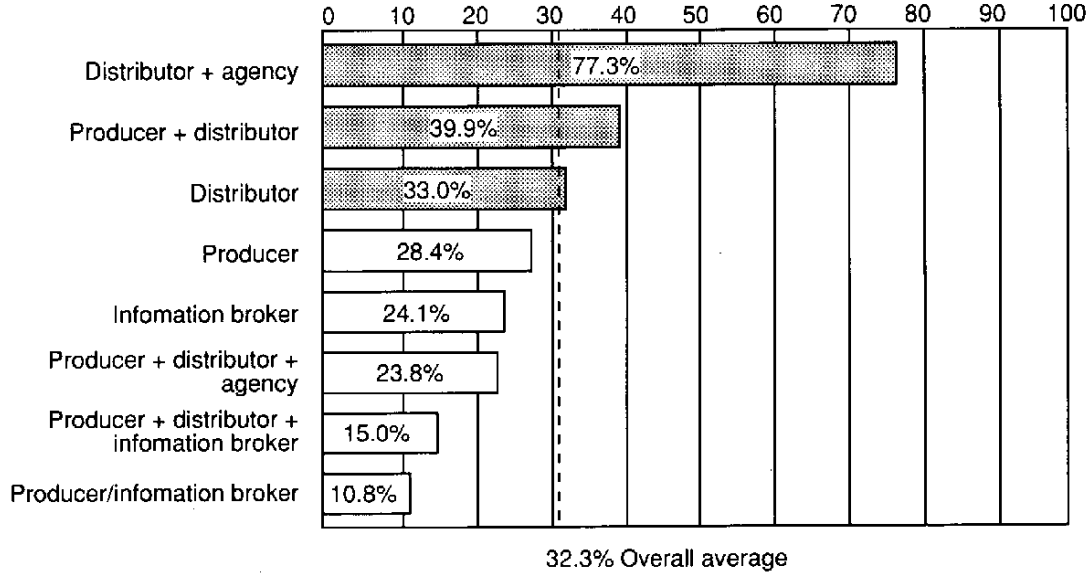


Figure 2-9 Annual Average Growth Rate of Database Service Sales

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

The third index is high at 84.2% in overall average. This shows a further increase from the previous percentage which was high at 82.3%, proving a high utilization ratio of domestic distributors. The number of databases available is large for foreign - made databases (73.1%) as compared to 26.9% for domestic (1988 Database Directory: actual number). That is, foreign - made databases are larger in number, but the business of database service enterprises relies more on domestic databases. By industry category, (1) producer, (2) producer and distributor and information broker achieved 100% of domestic database sales. Apart from this, the producer and information broker showed a high percentage at 90%. In contrast, only distributor and agency showed sales of foreign - made databases as more than half of gross sales.

With respect to the fourth index, 54.4% of the sales of domestic databases and 77.6% of foreign - made databases were for on-line services. In the case of foreign - made databases, databases are located mostly in foreign countries and utilization is naturally via the telecommunication line in most of cases. From the standpoint of users, utilization of domestic databases is primarily on-line. Actually, an analysis of the section "Users" shows that on-line utilization by users is as high as 93%. In contrast, on-line utilization of domestic databases was estimated at 54.4% (slightly more than half) by the survey on vendors because the database supply pattern by vendors varies widely. For example, producers deliver the database mostly in the form of magnetic tape, etc. to distributors.

6.3 Database Production Cost

Database production cost is broadly divided into (1) software development cost (program development and system design), (2) production cost (data collection, analysis, processing, input), and (3) computer fees, manual preparation and other expenses.

For database producers, database production reportedly takes both time and money. Analysis of responses from 64 enterprises show that 52.5% of the costs is for production itself. Among such cost, input occupies the highest percentage at 24.7% (Figure 2-10).

6.4 Problems for Construction

The three major problems which face producers when producing the database are (1) time and money for production, (2) heavy maintenance cost burden, and (3) difficulty of recovery of initial investment. All of these problems are related to cost. These problems are followed by deficiency in skills, software deficiency and insufficient subsidies.

The problem order is not substantially changed from that of the previous survey. Note that "insufficient review for standardization" which was ranked fifth in the previous survey is now ranked eighth (Figure 2-11).

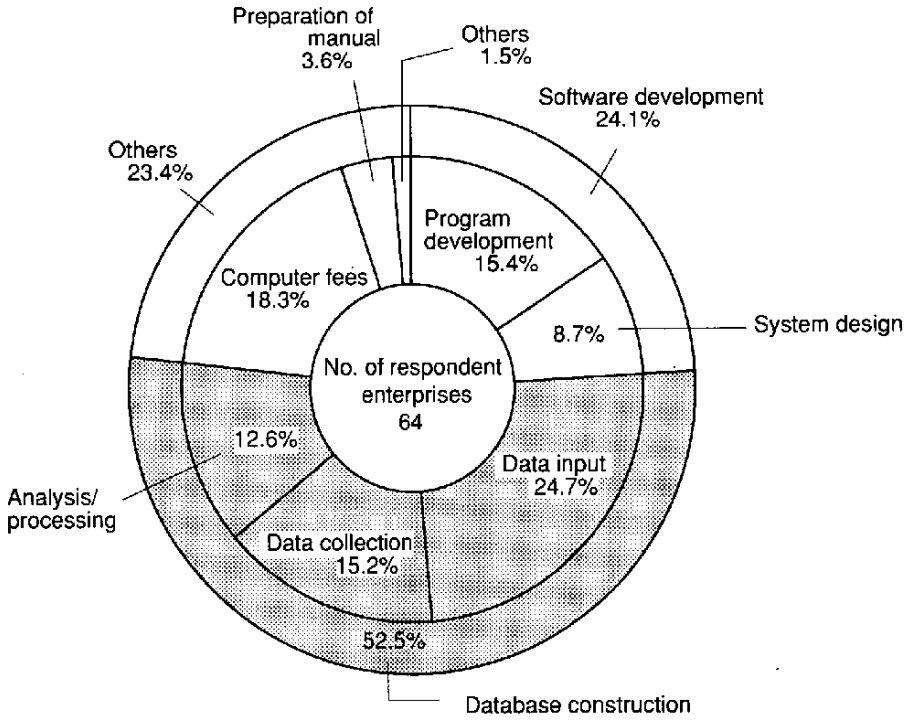


Figure 2-10 Component Ratio of Database Production Cost (Distribution ratio)

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

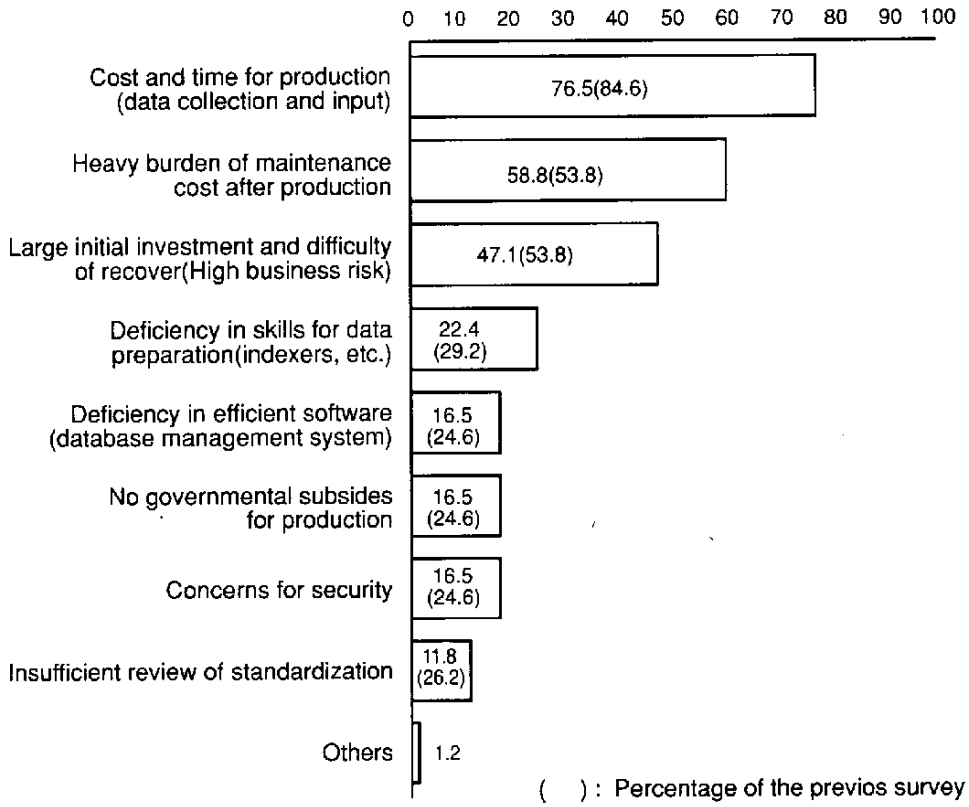


Figure 2-11 Problems for Production of Database (N=85, multiple replies)

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

6.5 Distribution Method

What method do producers use to distribute the databases? The method most frequently used was self-service (73.6%), which supports the fact that the number of producers and distributors is large in the Japanese database service business. What is noted is the pattern trend of supplying databases to two or more different enterprises and offering services to end users via these enterprises. For example, the percentage of supplying database to two or more enterprises has increased from 12.1% in 1987, to 35.3% in 1988, and to 39.1% in 1989.

In the U.S., it is a general practice for the same database to be supplied from multiple of distributors. Progress in this trend in Japan will help in activating the distribution mechanism (Table 2-4).

Table 2-4 Database Distribution Method (N=87, multiple responses)

	No. of databases	Percentage
Self-service	64	73.6
Database supply to another company	10	11.5
Database supply to two or more companies	34	39.1

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

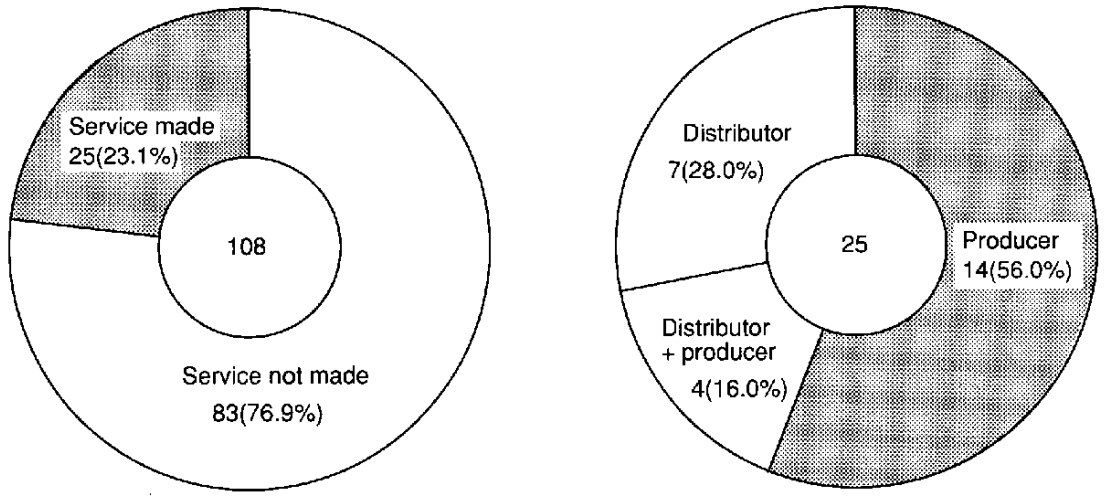
6.6 State of Overseas Supply

For years, Japan has been said to supply only a small amount of databases to the outside in spite of a considerable amount of overseas information obtained in the form of databases. Gradually, however, the number of vendors supplying databases to foreign countries is increasing in Japan.

According to this survey, 25 (23.1%) enterprises of the 108 responding enterprises answered that they supply database services to foreign countries. In the previous survey, this figure was 14 (17.3%) of 81 respondent enterprises. In both surveys, producer supply showed high percentages of respectively 56% and 58% (more than half) (Figure 2-12).

Among 105 vendors, 32.4% planned to supply new databases (including additional databases) to foreign countries. It is, therefore, expected that database supply to foreign countries will further increase in the future. Supply as a producer, distributor, and producer and distributor also showed high percentages of respectively 39.4%, 36.4%, and 24.2%. This fact indicates a variation of the supply type (not limited to supply as a producer) (Figure 2-13).

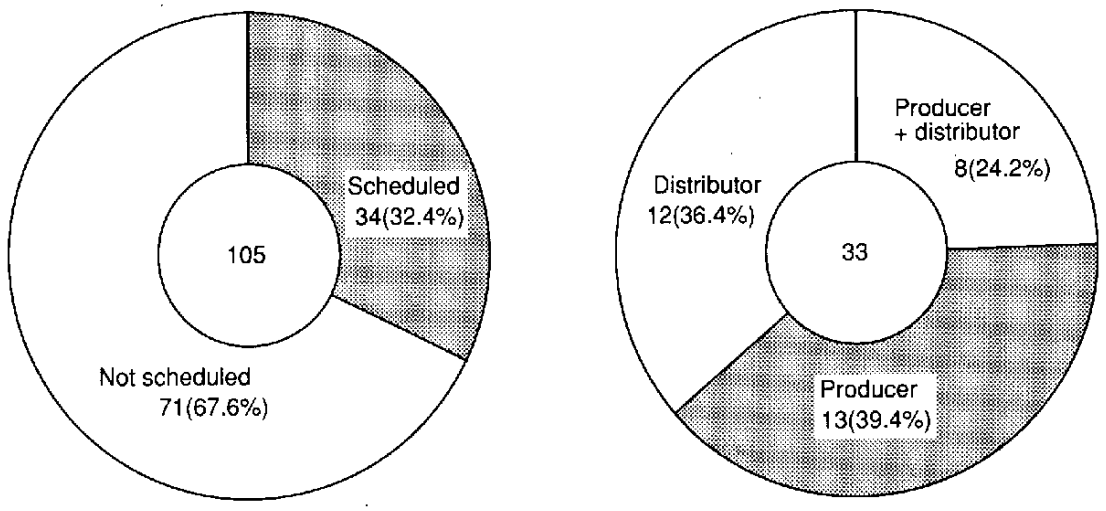
Concerning problems associated with supply to foreign countries, 55.2% (highest percentage) of vendors pointed out the translation cost. Apart from this, the sales network, operation system, and understanding of overseas needs recorded more than 40% (Figure 2-14).



(1) Overseas service state (2) Position of overseas service

Figure 2-12 Overseas Database Supply and Position

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990



(1) Schedule of overseas service (2) Scheduled position of overseas service

Figure 2-13 Schedule of Overseas Service

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

2.7 Attitude toward CD-ROM

As regards database supply in the form of CD-ROM, 23 (21.7%) of 106 responding enterprises answered that the supply was being made. And, 30 enterprises plan to supply database on CD-ROM in the future. For the future, CD-ROM is highlighted as a promising media.

Databases currently supplied or scheduled to be supplied include 37 and 77 kinds respectively. By sector, the business sector has the highest percentage both for the present and future.

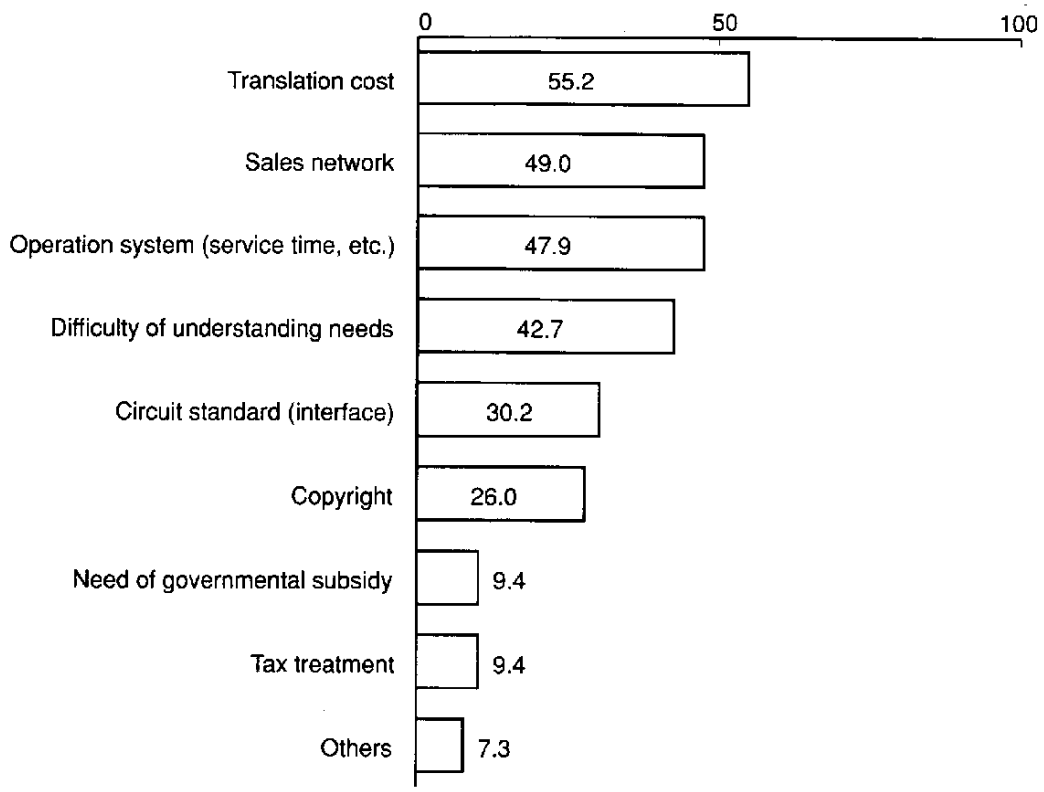


Figure 2-14 Problems Associated with Overseas Database Supply (N=96)

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

2.8 Future Subjects

What kinds of concerns are database service enterprises facing in the database business? The response of 55% (of a total of 133 enterprises) answered "Value of information supply not been acknowledged," followed by "developing of skills" and "reduction of production cost" respectively at 48.1% (Figure 2-15).

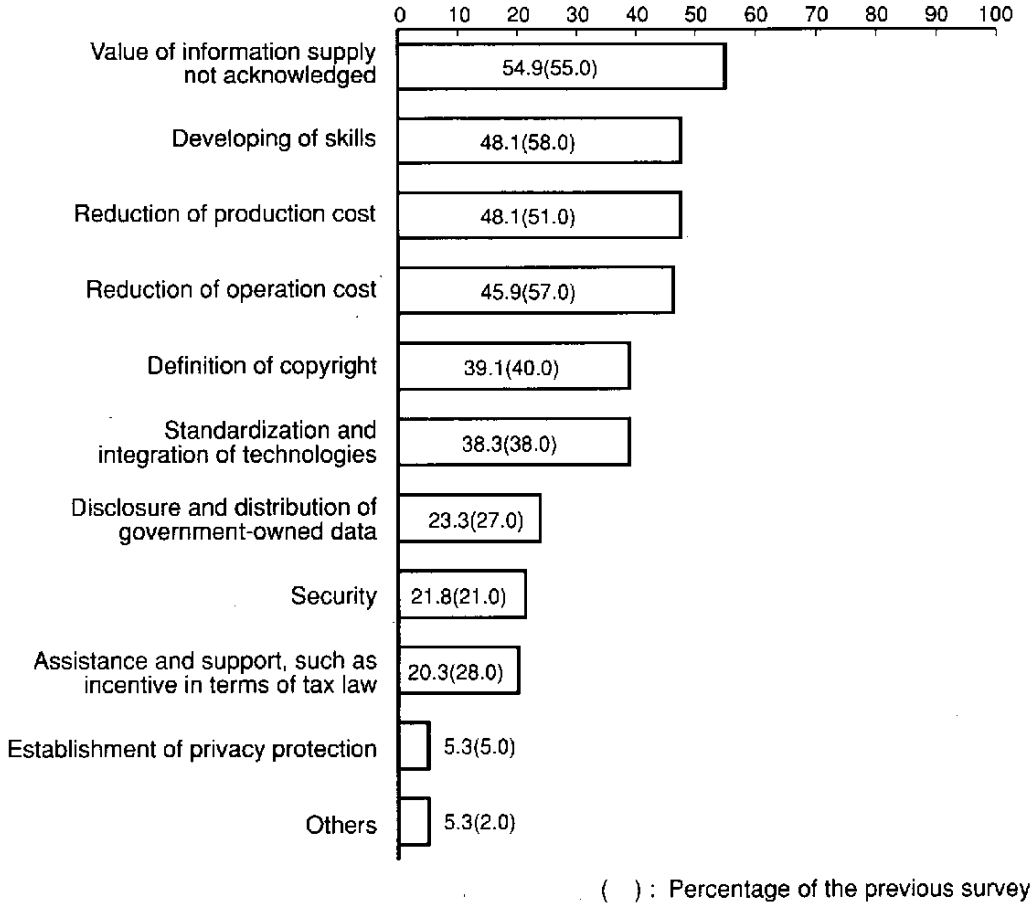


Figure 2-15 Future Subjects of Database Service

Source: "Survey of User Awareness of Database Service - Vendors," DPC, March 1990

III. COMMERCIAL DATABASE UTILIZATION STATE

The state of database utilization state and problems associated with utilization are introduced while referring to "Survey of Users Awareness of Database Services" (September, 1989).

1. Utilization Record and Schedule

1.1 Annual Utilization Total

The database utilization total as viewed from the domestic and foreign - made database ratio shows 66.8% for domestic (actual record of 1989) (Figure 3-1). In contrast, the percent composition of domestic databases based on the actual number of databases shown in the Database Directory was 31.1%. This indicates that the domestic - foreign ratio has been inverted in actual number and utilization total.

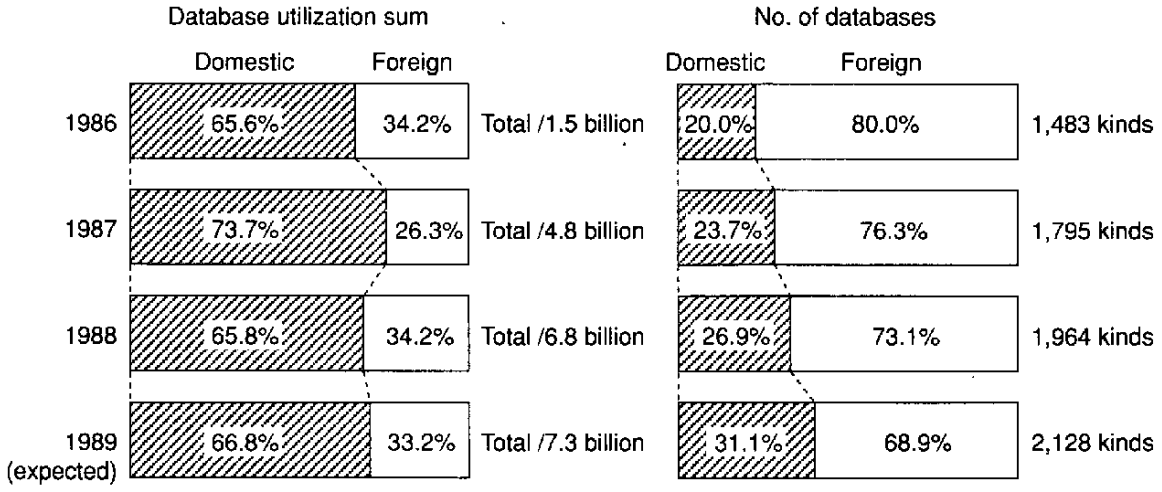


Figure 3-1 Domestic - Foreign Ratio

Source: "Database Directory," MITI
"Survey of User Awareness of Database Service," DPC, March 1990

When viewed from the overall growth rate, the actual number of databases showed a 9.4% increase from the previous year while the utilization total showed a 40.8% increase. This means that the utilization total per database is also increasing.

When the database utilization sum per enterprise is analyzed from the overall average, the actual record was ¥16.85 million for 1988 and estimated to be ¥18.18 million for 1989.

In particular, the total utilization sum of "insurance" and "securities" far exceeds that of others (insurance: eight enterprises for ¥1.433,61 billion, securities: two enterprises for ¥1.723,53 billion) (Table 3-1).

Table 3-1 Database Utilization Total per Enterprise of Each Industry (Principal five industries)

(Unit: ¥10,000)

Year / Breakdown / Industry	1987	1988			1989 (expected)		
	Total	Total	Domestic	Foreign	Total	Domestic	Foreign
Pharmaceutical	1,493	1,946	1,242	807	2,194	1,394	891
Chemical	607	1,052	487	679	1,177	555	687
Electric equipment manufacturer	1,178	1,444	662	206	1,087	862	289
Transport equipment manufacturer	355	1,312	1,052	325	1,206	917	371
Banking	1,376	6,296	3,630	6,932	5,893	3,414	6,941
Average of all industries	1,348	1,685	1,091	887	1,818	1,226	994
All industries (excluding insurance and securities)	595.5	921.2	562.7	496.0	943.1	619.8	529.1

Source: "Survey of User Awareness of Database Service," DPC, March 1990

1.2 Database Utilization State by Sector

Utilization state by sector in terms of the total base shows 27.3% in simple average for "research and study," 22.9% for "investigation," and 13.6% for "patent." There exists considerable difference in utilization among sectors (Table 3-2).

Table 3-2 Database Utilization State by Sector (Based on the sum for 1988)

(Simple average with N=411)

Sector	Utilization ratio (%)
Research	27.3
Investigation	22.9
Patent	13.6
Business	9.3
Planning	8.9
General affairs	2.5
Production	2.2
System development	1.8
Others	11.1

Source: "Survey of User Awareness of Database Service," DPC, March 1990

1.3 Database Utilization Time

Figure 3-2 shows the database utilization time per month for domestic and foreign - made databases. The average utilization time of all industries is 55.8 hours, including 41.5 hours for domestic databases and 14.2 hours for foreign - made. Industries shown in this table are the top ten enterprises. Electric equipment manufacturer, construction, and commerce are on the same level, but may be characterized in the ratio of utilization time between domestic and foreign databases. The ratio for domestic databases is particularly high in the steel industry and information processing service/software/information supply. In contrast, the ratio of utilization time for foreign databases is high in school/other educational organization, pharmaceutical. and chemical industries. Adding this utilization time to the utilization total may lead to estimation

of the database utilization charge per hour. Note that the utilization time was longest (334 hours per month) in the insurance industry, although responding enterprises were less than 10.

2. On-Line Utilization Pattern

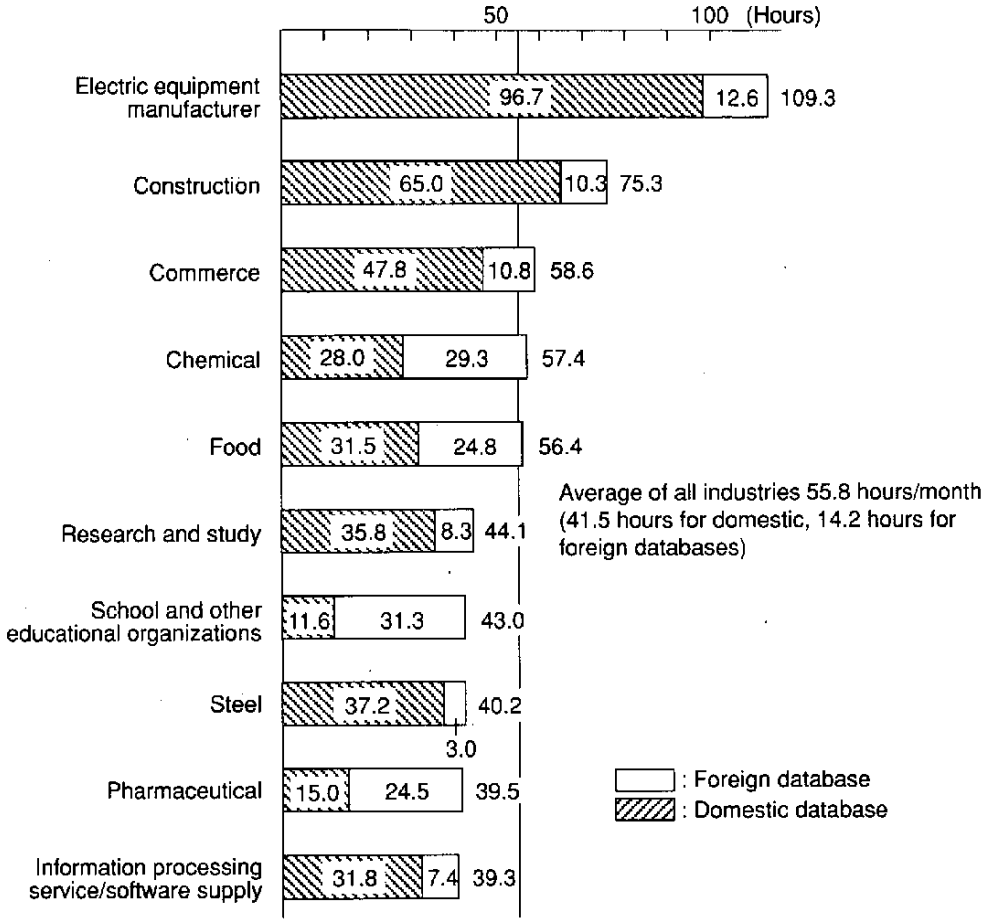


Figure 3-2 Utilization Time per Month (On-line)

Source: "Survey of User Awareness of Database Service," DPC, March 1990

2.1 On-Line Utilization Pattern

For on-line utilization, the orthodox method of displaying a search result on a terminal and printing it out accounts for the highest percentage at 94.0%. It is also known that the number of users for high-level utilization of the result through down-loading has not increased much. This may be due to the fact that the number of databases allowing down-loading of data is not large. This ratio is expected to increase in the future depending on the progress of copyright problems.

2.2 Terminal and Circuit Speed

Table 3-3 shows the terminal model of users and the circuit speed. Eleven enterprises answered that they use a wordprocessor as a terminal via a public circuit, and this trend is expected to increase. In all terminals, the circuit speed was mostly 1,200 bps and users appear

to be shifting toward the use of higher speed circuits when compared with the result of the previous survey.

In contrast, as regards utilization via private circuit, use of 2,400 bps ranked top both for personal computer and exclusive terminal. The trend of using a higher speed circuit of 4,800 bps or more will continue in the future.

Table 3-3 Terminals Used and Circuit Speed (Multiple replies)

Terminal	Public circuit					Private circuit				
	300bps (%)	1,200bps (%)	2,400bps (%)	2,400bps< (%)	Total (enterprises)	2,400bps (%)	4,800bps (%)	9,600bps (%)	9,600bps< (%)	Total (enterprises)
Personal computer	49.3	80.6	29.1	2.2	402	60.0	28.0	32.0	0.0	25
Word processor	0.0	72.7	18.2	9.1	11	100.0	50.0	50.0	50.0	2
Exclusive terminal, etc.	50.0	51.3	17.1	3.9	76	52.4	33.3	33.3	9.5	21

Source: "Survey of User Awareness of Database Service," DPC, March 1990

3. Utilization Other than On-Line

The utilization patterns other than on-line and their ratio are shown in Table 3-4. "Utilization of SDI service" ranks top at 47.1%. The growth rate from the previous survey is high and this demand will continue. Another feature of this survey is increase in reply "entrusting to information broker." The ratio of "purchase of commercial database in magnetic tape, FD, and CD-ROM", which has shown rapid increase in the previous survey, decreased only slightly. However, the number of replies increased by 13% over the previous survey.

Table 3-4 Utilization Patterns other than On-line (Multiple replies)

Utilization pattern	1988	1989
	(%)	(%)
Utilization of SDI service	40.8	47.1
Purchase of commercial database in a form of magnetic tape, FD, and CD-ROM	39.7	37.9
Request of search and mailing of output result	25.9	27.2
Request to information broker	9.8	13.1
Visit to service enterprise for utilization	5.2	5.8
Others	5.2	2.9
	(N=174)	(N=206)

Source: "Survey of User Awareness of Database Service," DPC, March 1990

As regards the media of purchasing database information, the percent composition of magnetic tape and CD-ROM has become nearly equal. As compared with the previous 70.2%, the percentage of magnetic tape declined to 52.1% this time. In contrast, the percentage of CD-ROM increased substantially from 19.8% to 38.8% (Table 3-5). As the number of CD-ROM software increases, users can select media appropriate to the manner of utilization.

Table 3-5 Purchase Ratio of Magnetic Tape, FD, and CD-ROM

Purchase media	1988		1989	
	No. of replies	Percentage	No. of replies	Percentage
Magnetic tape	78	70.2	63	52.1
CD-ROM	22	19.8	47	38.8
Floppy disk	11	10.0	8	6.6

Source: "Survey of User Awareness of Database Service," DPC, March 1990

4. System and Database Used Frequently

Table 3-6 shows the service systems which more than 10 enterprises responded to on use frequency. This table shows the aggregate of the top three systems with a large utilization total of each enterprise. The number of responses and orders do not agree because of the difference in the utilization total per enterprise.

Table 3-6 Service Systems with High Utilization Total (Multiple replies)

Order in 1988	1989		Name of service systems
	Order	No. of replies	
3	1	177	PATOLIS
2	2	185	DIALOG
1	3	250	JOIS
14	4	14	QUICK Video-I
6	5	57	STN
4	6	148	Nikkei Telecom
9	7	22	COSMOS
5	8	36	NEEDS-IR
8	9	19	TSR
11	10	20	BRANDY
7	11	11	BRS
13	12	18	HINET
10	13	14	DIALINE
15	14	16	NICHIGAI-ASSIST
	⋮	⋮	

Source: "Survey of User Awareness of Database Service," DPC, March 1990

Table 3-7 shows the databases used frequently. This shows that an aggregate of three databases is used frequently in each system.

Table 3-7 Databases with High Utilization Frequency (Multiple replies)

Order in 1988	1989		Database
	Order	No. of replies	
1	1	215	JICST, Japan scientific literature file
2	2	161	Japan patent utility model file
	3	150	Nikkei newspaper article database
4	4	92	MEDLINE
5	5	76	WPI
6	6	75	CA-SEARCH
7	7	66	JICST
8	8	62	CA
	9	61	Asahi Newspaper article database
24	10	50	Trademark file
3	11	48	NIKKEI file
8	12	43	INSPEC
12	13	42	BIOSIS
11	14	39	CLAIMS
21	15	35	COMPENDEX
	⋮	⋮	

Source: "Survey of User Awareness of Database Service," DPC, March 1990

5. Comments on System Utilization Charges

Comments of users on the charges of individual service systems are shown in Table 3-8. "Reasonable" gained the highest percentage, followed by "expensive", "don't know", and "not expensive" in this order. When the percentages of "reasonable" and "don't know" are included, the total exceeds 60%. This means that the remuneration for information has been recognized widely.

As comments were sought on database levels in previous surveys, no simple comparison is possible with the current surveys. It may be considered however that users continue to consider those with a long history of service less expensive, and those concerning patent and corporate finance as slightly expensive.

6. Problems of Commercial Database

6.1 Non-Integration of Commands

As a rule, present database services have search commands differing by system. Concerning this non-integration of commands, the survey result shows 76.2% for "inconvenient" and 23.8% as "not inconvenient." This situation has not changed in the past two years. Still, non-integration of commands remains to present inconvenience to users.

Table 3-8 Comments on Utilization Charges (Multiple replies)

( ): %

Name of system	No. of respondent enterprises	Comment			
		Not expensive	Reasonable	Don't know	Expensive
ACE	14	1 (7.1)	2 (14.3)	7 (50.0)	4 (28.6)
BRANDY	60	2 (3.3)	15 (25.0)	19 (31.7)	24 (40.0)
BRS	61	12 (19.7)	26 (42.6)	20 (32.8)	3 (4.9)
CAPITAL	13	2 (15.4)	4 (30.8)	4 (30.8)	3 (23.1)
CORNET	13	1 (7.7)	1 (7.7)	7 (53.8)	4 (30.8)
COSMOS	60	2 (3.3)	21 (35.0)	18 (30.0)	19 (31.7)
DIALINE	92	2 (2.2)	38 (41.3)	24 (26.1)	28 (30.4)
DIALOG	230	11 (4.8)	115 (50.0)	60 (26.1)	47 (20.4)
DOW JONES NEWS/RETRIEVAL	33	1 (3.0)	11 (33.3)	10 (30.3)	11 (33.3)
HINET	121	8 (6.6)	52 (43.0)	43 (35.5)	18 (14.9)
JOIS	301	14 (4.7)	158 (52.8)	62 (20.6)	68 (22.6)
NEEDS-IR	107	4 (3.7)	49 (45.8)	26 (24.3)	28 (26.2)
NEEDS-TS	32	2 (6.3)	8 (25.0)	10 (31.3)	12 (37.5)
NICHIGAI ASSIST	86	4 (4.7)	40 (46.5)	23 (26.7)	19 (22.1)
ORBIT	84	2 (2.4)	36 (42.9)	31 (36.9)	15 (17.9)
PATOLIS	209	0 (0.0)	47 (22.5)	39 (18.7)	123 (58.9)
QUICK Video-I	23	1 (4.3)	4 (17.4)	12 (52.2)	6 (26.1)
STN	116	4 (3.4)	51 (44.0)	30 (25.9)	33 (28.4)
TSR	92	2 (2.2)	36 (39.1)	15 (16.3)	39 (42.4)
Technomart	29	0 (0.0)	7 (24.1)	9 (31.0)	13 (44.8)
Nikkei Telecom	241	34 (14.1)	108 (44.8)	49 (20.3)	52 (21.6)
Others	42	1 (2.4)	9 (21.4)	9 (21.4)	23 (54.8)
Total	2,059	110	838	527	592

Source: "Survey of User Awareness of Database Service," DPC, March 1990

6.2 Comments on Function and Operability

Table 3-9 shows comments on functions and operability. "Integrated thesaurus necessary," "use of natural language as search language necessary," and "keywords not sufficient" which were pointed out in the previous survey were also pointed out this time by many enterprises. A remarkable change is that "gateway function necessary," whose percentage was only 8.6% in the previous survey, rose to a higher percentage of 23.3%. This indicates growing interest in gateway function. "Slow search speed" which ranked fourth in the previous survey increased in percentage by 7.8 points.

Table 3-9 Comments on Functions and Operability (Multiple replies)

Problems	1988	1989
Insufficient function keys	10.0 (%)	11.9 (%)
Only command type search method available	12.5	9.4
Only menu type search method available	9.7	10.9
Insufficient keywords	33.9	31.0
Integrated thesaurus necessary	45.6	43.6
Function enabling reference to appearance frequency of specific keyword by file or by database necessary	22.2	16.2
Down-loading not possible	28.1	24.2
Gateway function necessary	8.6	22.3
Function using expert system necessary	18.9	14.0
Use of natural language as search language necessary	35.3	37.5
Machine translation function not provided	7.5	9.2
Insufficient conversion function (kana, kanji)	10.6	11.4
Troublesome connection procedure	17.8	20.6
Slow search speed	33.6	41.4
Others	4.7	4.1
	(N=360)	(N=413)

Source: "Survey of User Awareness of Database Service," DPC, March 1990

7. Reason Why Commercial Database is not Used

For users who answered that they did not use commercial databases, the reason was queried (Table 3-10). "No need" remained top ranked (57.3%), followed by "expensive database charge" (20.9%), "no budget" (17.0%). This table shows that the hardware and software burden is not the major reason why users do not use databases.

8. Utilization State of CD-ROM

8.1 Reason and Frequency of Utilization

As regards utilization of CD-ROM, only 51 (7.5%) enterprises answered that they use CD-ROM. The reasons include "space saving more than microfilm and printing" at 68.1%, followed by "no communication cost" at 46.8%, "fixed payment charges at one time" at 34.0%, and "suitable for training of in-house information search" at 23.4% (Figure 3-3).

With respect to utilization frequency, the percentage for "every day" was highest at 41.7%, indicating full exploitation of the merits of introduction (Figure 3-4). The average time per search is 1.39 hours in average for all industries, but individual replies show that nearly half of enterprise use was for less than one hour.

Table 3-10 Reasons why Commercial Databases are not Used (Multiple replies)

Reason	1988	1989
Usage not known	10.0 (%)	13.4 (%)
Did not known that they exist	9.1	11.1
Complicated use procedure	3.6	2.8
No terminal	4.2	2.8
Expensive terminal (excluding communication equipment)	8.4	7.5
Expensive communication software	7.1	3.2
Expensive communication charge	13.9	11.5
Expensive database use charges	25.9	20.9
No budget	15.5	17.0
No searcher	9.1	7.9
Required database does not exist	7.4	9.9
No need	56.6	57.3
Expensive communication equipment (modem, etc.)	1.6	0.4
Others	5.8	9.1

Source: "Survey of User Awareness of Database Service," DPC, March 1990

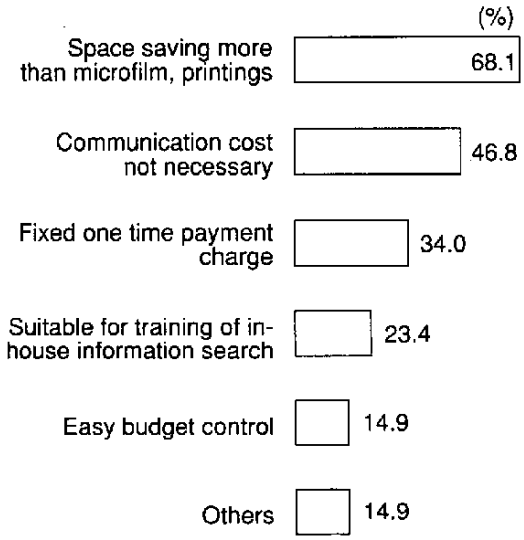


Figure 3-3 Reason of Utilizing CD-ROM (N=47, multiple replies)

Source: "Survey of User Awareness of Database Service," DPC, March 1990

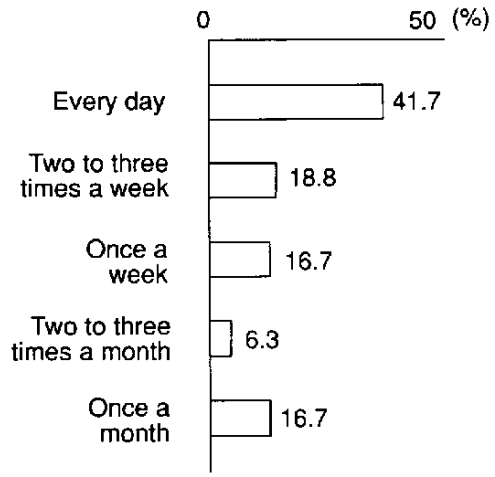


Figure 3-4 CD-ROM Utilization Frequency (N=20)

Source: "Survey of User Awareness of Database Service," DPC, March 1990

8.2 Inconveniences for Utilization

Figure 3-5 shows inconveniences during actual utilization of CD-ROM.

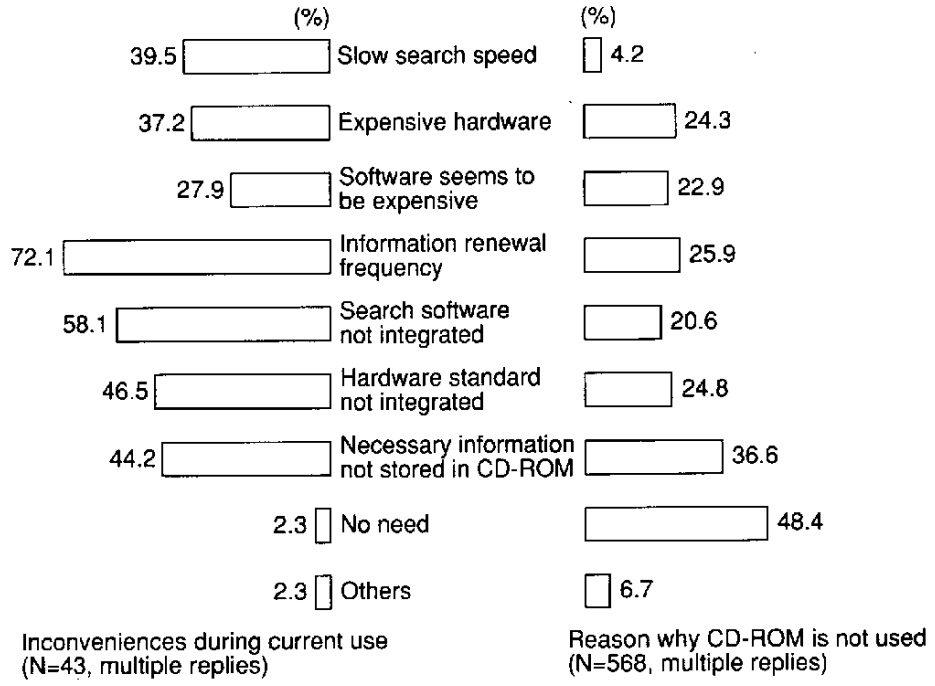


Figure 3-5 Problems of CD-ROM

Source: "Survey of User Awareness of Database Service," DPC, March 1990

8.3 Information to be Stored in CD-ROM in Future

Regardless of whether or not CD-ROM is used at present, the information to be stored in CD-ROM in the future includes: "science and technology/patent," ranked top at 27.5%, followed by "dictionaries/encyclopedia/directory," ranked at 26.2%, "map/mapping/phone num-

ber/address code," ranked at 24.0%, "bibliography/documents and publishing information," ranked at 20.0%, and "enterprise and financial information," ranked at 19/4% (Table 3-11).

Table 3-11 CD-ROM Required in Future (N=454, multiple replies)

Information field	No. of replies	Percentage
Science technology/patent	125	27.5
Dictionaries/encyclopedia/ directory	119	26.2
Map and mapping/phone number/ address code	109	24.0
Bibliography/documents and publishing information	91	20.0
Enterprise and financial information	88	19.4
Who's who	82	18.1
Commodities and product information	75	16.5
Medicine and medical/biochemistry/ chemistry	74	16.3
Newspaper/magazine/news	74	16.3
Computer/software	71	15.6

Source: "Survey of User Awareness of Database Service," DPC, March 1990

IV. PRESENT SITUATION OF IN-HOUSE DATABASE

1. Progress of Information Orientation of Enterprises

Information is now of such importance as to be called the fourth resource of business activity. The largest problem for information distribution of enterprises, however, is effective execution of information arrangement and processing. Enterprises promote information orientation for purposes of (1) rationalization and efficiency enhancement of business and (2) strategic utilization of information. Purpose (1) has played an important role in information orientation of enterprises, achieving success in office processing and ordering/order acceptance. Purpose (2) is to ensure effective utilization of information as a resource and is thus strategic in that the management is to be developed positively through understanding of market needs and internal information resources. This is currently put into the so-called strategic information system.

2. Present Situation and Problems of In-House Database Production

According to the DPC "Survey of Users Awareness of Database Service" (September 1989), 461 (65.8%) of the total (701 organizations) had in-house databases (Table 4-1).

Table 4-1 In-house Database Possession

(%)

	1987	1988	1989
Possession	57.0	64.9	65.8
Not possessing	43.0	35.1	34.2
	(N=577)	(N=690)	(N=701)

Source: "Survey of User Awareness of Database Service," DPC

The percentage of enterprises processing in-house databases is increasing every year.

The content (application) includes "personnel management" (43.3%), "customer management" (35.8%), and "finance and accounting" (32.5%) (Table 4-2). This "Best Three of In-house Databases" has not changed for two years. In this way, in-house databases may be characterized by predominant count information (personnel, customer and finance) and less text information (technology, patent, person and article).

Notwithstanding this, Table 4-2 shows a substantial increase in "technical information" and "patent information" in the past three years. This indicates that database production using text information has begun in the technology sector.

Table 4-2 In-house Database Operation (Multiple replies)

	1987		1988		1989	
	Rank	%	Rank	%	Rank	%
Personnel management	1	33.4	1	42.1	1	43.3
Customer management	2	33.1	2	33.2	2	35.8
Finance and accounting	5	26.6	3	29.1	3	32.5
Technical information	10	10.6	5	24.3	4	27.8
Inventory control	4	27.5	4	27.9	5	23.8
Patent information	11	5.3	7	18.5	6	19.6
Production/part control	6	18.8	6	22.0	7	16.3
Management	8	15.0	10	13.3	8	15.9
Document filing	3	28.8	9	15.6	9	14.1
Statistics	7	18.1	8	16.5	10	13.5
Personal/membership information	12	4.4	12	9.4	11	12.1
Articles(newspaper)	9	11.3	11	10.5	12	11.0
Company credit	13	4.1	14	1.6	13	4.2
POS(Point of Sales)	14	2.8	13	3.9	14	3.8
Operation/reservation control	15	2.2	15	1.4	15	2.4

Source: "Survey of User Awareness of Database Service," DPC

3. Database in Enterprises

3.1 In-House Database occupies Key Position in Strategic

To proceed with information orientation of an enterprise and to produce an in-house database, various information scattered about within an enterprise needs to be concentratedly controlled through utilization of information technology. In this way, information systems and database are undergoing transformation from tools for job rationalization and labor savings to a weapon for discrimination of merchandise and market penetration. An information system organized in this manner is a strategic information system.

This system has the following features:

(1) Differing from individual systems, such system handles the various information of a company in a total, generalized manner. For example, sales, distribution, accounting, production, research and development, which have conventionally been in relation to each other, are tied together for reorganization of information with a market focus.

(2) Cooperative effort of experts in various fields of an enterprise are necessary to produce such a system.

(3) This is not a system for fixed-job processing and thus should be sufficiently flexible to cope with trial and error during production and operation.

As a result, the importance of a database as a system has greatly increased. Improvement and expansion of in-house databases will be advanced further as the keystone for sharing of in-house information and strategic utilization.

V. INTERNATIONAL DEVELOPMENT OF DATABASES

1. Globalization of Japanese Database Services

1.1 State of Globalization

Japanese Database Industry Association (DINA) has been conducting a series of survey of its members and other Japanese database services in order to establish the availability of Japanese database services in the overseas market, as well as to find out the problems encountered by those who are expanding their services abroad. The questionnaire was distributed to a total of 192 companies (107 members of DINA, and 85 others), and 144 valid responses were delivered (75.0% response ratio) by July 30, 1990.

Of the organizations which responded, currently 49 are offering database services abroad, while an other 20 are planning such services.

The results show that a total of 155 (Table 5-1) databases are accessible by overseas users. (Note that where the same database is offered by two or more service companies, the databases are counted as one in the table which consists of the list of 172 databases).

Table 5-1 Number of Japanese Databases Available from Overseas

Time of Survey / Subject	February 1987	July 1988	July 1989	July 1990
Science and Technology	9	20	22	39
Economics, Business, Finance	16	51	65	82
General	3	14	23	51
Total	28	85[1)]	110[2)]	172[3)]

Note 1) : Total for 1988 survey include duplicates. Actual number is 83.
Note 2) : Total for 1989 survey include duplicates. Actual number is 104.
Note 3) : Total for 1990 survey include duplicates. Actural number is 155.

The following two tables show a description of Japanese databases offered for overseas use and a summary of Japanese databases being planned for overseas expansion as of July 30, 1990.

Table 5-2 Japanese Databases Accessible Overseas

Subject: ① Science and Technology
② Economics, Business and Finance
③ General or Others

Language: J : Japanese
E : English
O : Others

Vendor Status: P : Producer
D : Distributor
A : Agent
T : Telecommunications
O : Others

Format: O : On-Lline
M : MT, FD
C : CD-ROM, CD-I

Reference: B : Branch Office
D : Collaboration
A : Agent

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
Asahi Shimbun Publishing Company	ASAHI NEWS SERVICE	Collection of articles translated into English from the Asahi Shimbun with those originally written in English	③	E	P	O	U.S. U.K.
	HIASK	Collection of all the Asahi Shimbun articles	③	J	P	O	U.S. Europe
Asia Data Research, Inc. (ADR)	South East Asian Sales Trends Market Research	Research into retail sales of cameras and home electric appliances in South East Asia	②	J/E	P/D	M	Hong Kong Singapore Malaysia Thailand Taiwan
Japan Medical Abstracts Society (JAMAS)	JMED (JAMAS' part)	Secondary literature for medical information	①	J/E	P	O	
EDUCA Inc. (EDUCA)	Glorier Encyclopedia	Japanese version of Glorier Encyclopedia	③	J	P	O	U.S.
Electronic Library Incorporated (EL)	ELNET	Collection of articles from 34 newspapers and about 250 magazines	③	J	P/D	O	
The New Materials Center, the Foundation of Osaka Science and Technology Center (NMC)	Metalic New Material Catalog Data System	3000 catalog data for metalic new materials, provided by 150 companies in Japan	①	J	P/D	C	
KMS Inc.	KMS	Business information, e.g. marketing research on foreign countries, trends of consumers	②	J	P	M	
KAIJI PRESS, CO., LTD. (KP)	KEEP-SB	New shipbuilding information on 40 Japanese companies, 4 Korean and CSBC of Taiwan	②	E	P/A	O	Korea Taiwan
Japan Association for International Chemical Information (JAICI)	NQR (Nuclear Quardrupole Resonance) database	Worldwide literature on NQRS and NQR	①	E	P/D	M	Europe U.S.
	CHEM-J	Bibliographic information of chemical literature	①	E	P/D	M	Europe U.S.
KK Kyodo News Service (KK Kyodo)	JED	Flash report, cumulative	②	E	P	O	U.S.
	JLS	Flash report database	②	J	P/D	O	Worldwide
	KEES	Cumulative database	③	E	P	O	U.S.

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
QUICK Corp.	QUICK Video-1	Economic information and news, focused on securities	②	J/E/O: Numeric	P/D	O	18 countries of Hong Kong, U.K., U.S. and others
	QUICK-10	Comprehensive economic information and news, focused on securities, finance, and exchanges	②	J/E/O: Numeric	P/D		Hong Kong Singapore Australia
	QUICK-10E	European version of QUICK-10. Presented by QUICK EUROPE LIMITED.	②	J/E/O: Numeric	P/D	O	11 countries of U.K., U.S., Switzerland and others
	QUICK indicator board	Various economic indicators	②	O: Numeric	P/D	O	Hong Kong U.K.
Keizai Bunken Kenkyukai	JOINT (Journal of Industrial Titles)	A database of magazine articles on economics and industry	②	J	P	O	Worldwide
Chemical Data Service Incorporated (CDS)	CD-NET	Comprehensive information for chemical industry	②	J	P/D	O	U.S. U.K. Germany
National Diet Library (NDL)	JAPAN MARC (M)	Catalog of books published in Japan	③	J	P	M/C	Canada
	JAPAN MARC (S)	Catalog of serials published in Japan	③	J	P	M	Canada
COMLINE International Corporation (COMLINE)	Tokyo Financial Wire	Financial, economic, industrial, and corporate news on Japan	②	E	P/D	O/M/C	U.S. Europe
	COMLINE Industrial Monitor	News from Japan's industrial and government sectors, with a special emphasis places on high technology	②	E	P/D	O/M/C	U.S. Europe
	COMLINE Business Analysis	Identifies and analyzes Japan's technological developments and their impact on business and growth potential of new and established Japanese corporations	②	E	P/D	O/M/C	U.S. Europe
Jiji Press, Ltd.	MAIN	Comprehensive securities and financial information	②	J	P	O	Hong Kong Singapore
	JSD	Lists of prices for all issues on the TSE first section, Osaka first and second sections, and all issues on the NYSE and AMEX	②	E	P	O	U.S. Others
Japan Food Industry Center (JAFIC)	Food Industry Information File	Bibliographic data for technologies of food industries, Japan and abroad	①	J	P	O	
TEIKOKU DATABANK, LTD. (TDB)	COSMOS 2	Summarized data on 900,000 firms in Japan	②	J	P	O	Worldwide
TEIKOKU DATABANK, LTD. (TDE)	Nikkei Telecom	Summarized data on 900,000 firms in Japan	②	J	P	O	Worldwide
Technomic Information Service Inc.	PHARMCAST	Information about R & D for medical supplies in the world	①	E	P	O	U.S. Europe
TOKYO SHOKO RESEARCH, LTD.	Nikkei Telecom	Information on industries and firms	②	J	P	O	

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
The Daily Industrial News, LTD.	The Daily Industrial News Information Database	Collection of articles from the Daily Industrial News	③	J	P	O	U.S. France
NISSHO ELECTRONICS CORPORATION (NELCO)	National Large-Taxpayers File	Large-taxpayers who payed more than ¥10,000,000 annually	②	J	P/D/A	M	
Nichigai Associates, Inc.	WHO	Profiles of people extracted from newspapers, magazines, and books published in Japan. Bibliographic information is included	③	J	P	O	
	BOOK	Bibliographies and contents of books published in Japan	③	J	P	O/M/C	
	MAGAZINE	Indexed articles from 1300 magazines published in Japan	③	J	P	O	
The Japan Audit Bureau of Circulations (ABC)	ABC Circulation Report	Circulation data on journals and newspapers, interchangeable between U. S. A. and Japan	②	E	P	M	Canada U.S.
The Japan Information Center of Science and Technology (JICST)	JOIS						
	JICST File on Science and Technology	Literature on science and technology, collected from scholarly journals, reports, proceedings, technical notes and others in 50 countries.	①	J	P/D	O	U.S. Germany U.K. Korea
	JICST File on Medical Science in Japan	Literature on medical science in Japan (integrated with Japan Medical Abstracts by JAMAS)	①	J	P/D	O	U.S. Germany U.K., Korea
	JICST File on Current Science and Technology Research in Japan	Research information files on research projects, planning and ongoing in Japan	①	J	P/D	O	U.S. Germany U.K. Korea
	JICST Holding List File	Information on JICST library resources	③	J	P/D	O	U.S. Germany U.K., Korea
	JICST File on Science, Technology and Medicine in Japan (in English)	English translations of articles on science, technology and medicine in JICST File on Science and Technology, and JICST File on Medical Science in Japan	①	E	P/D	O	U.S. Germany U.K. Korea
	STN						
	JICST-E	Comprehensive Japanese literature relating to science, technology and medicine	①	E	P/D	O	U.S. Europe U.K. Others
	JGRIP	Data on research being carried out at public-owned research institutes in Japan	①	E	P/D	O	U.S. Europe U.K. Others
JAPAN CHEMICAL INDUSTRY ECOLOGY-TOXICOLOGY & INFORMATION CENTER (JETOC)	JETOC/KASHIN	Inventory of existing chemical substance in "Chemical Substance Control Law" in Japan	③	J	P/D	O	U.S. (retrieval services only for foreign countries)

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
JAPAN MACHINERY DESIGN CENTER (JMDC)	Information Retrieval for Trademarks, Japan and Abroad	Information retrieval system for trademarks, Japan and abroad	③	J/P	M		
Nihon Keizai Shimbun, Inc. (NIKKEI)	NEEDS						
	Nikkei Basic Corporate File	Company outlines	②	J/E	P/D/A	O/M	U.S. Europe
	Listing Annual Accounting Settlement Data	Data on the annual and interim settlements of listed companies and consolidated settlements	②	J/E	P/D/A	O/M	U.S. Europe
	Flash Reports on Financial Data for Listed Companies	Flash report data on the financial affairs of listed companies	②	J/E	P/D/A	O/M	U.S. Europe
	Corporate Earning Estimates for Listed Companies	Flash report data on corporate earnings estimates for listed companies	②	J/E	P/D/A	O/M	U.S. Europe
	Securities Reports on Non-Listed Companies	Data on major non-listed companies which issue securities	②	J/E	P/D/A	O/M	U.S. Europe
	Reports to Shareholders on Major Non-Listed Companies	Business data on major non-listed companies	②	J/E	P/D/A	O/M	U.S. Europe
	Data on Corporate Borrowing by Financial Institution	Data on borrowings from financial institutions and the Industrial Bank of Japan	②	J/E	P/D/A	O/M	U.S. Europe
	Bank Financial Data	Data on the annual settlements of banks	②	J/E	P/D/A	O/M	U.S. Europe
	Securities Financial Data	Data on the annual settlements of securities	②	J/E	P/D/A	O/M	U.S. Europe
	Insurance Financial Data	Data on the annual settlements of insurance	②	J/E	P/D/A	O/M	U.S. Europe
	Stock and Bond Data	Stock and bond data	②	J/E	P/D/A	O/M	U.S. Europe
	Bond Futures Data	Bond futures data	②	J/E	P/D/A	O/M	U.S. Europe
	Stock Index Futures	Stock index futures	②	J/E	P/D/A	O/M	U.S. Europe
	Capital Market Indicators	Data on capital market indicators	②	J/E	P/D/A	O/M	U.S. Europe
	Securities Market Indicators	Daily data on securities market indicators	②	J/E	P/D/A	O/M	U.S. Europe
	Corporate Action	Data on company finances	②	J/E	P/D/A	O/M	U.S. Europe
	NEEDS-PORT FOLIO	Portfolio analysis	②	J/E	P/D/A	O	U.S. Europe

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
Nihon Keizai Shimbun, Inc. (NIKKEI)	NEEDS						
	Macro Economic Databank (NEEDS-ECONOMY)	Macro economic databank	②	J/E	P/D/A	O/M	U.S. Europe
	Input-Output Analysis Databank (NEEDS-10)	Input-output databank	②	E	P/D/A	O	U.S. Europe
	Energy Databank (NEEDS-ENERGY)	Energy databank	②	J/E	P/D/A	O/M	U.S. Europe
	IFS	IFS databank	②	E	P/D/A	O	U.S. Europe
	Statistical Survey of Incorporated Enterprises	Statistical data on incorporated enterprises	②	J/E	P/D/A	O/M	U.S. Europe
	Statistical Data on Consumption	Statistical data on consumption	②	J/E	P/D/A	O/M	U.S. Europe
	Commodity Databank (NEEDS-COMMODITY)	Commodity databank	②	J/E	P/D/A	O/M	U.S. Europe
	Comprehensive Economic Data by Size	Comprehensive economic data by scale	②	J/E	P/D/A	O/M	U.S. Europe
	Statistical Data on Wholesale/Export-Import Prices	Statistical data on wholesale and import/export prices of goods	②	J/E	P/D/A	O/M	U.S. Europe
	Marketing Databank (NEEDS-MDB)	Marketing databank	②	J/E	P/D/A	O/M	U.S. Europe
	Financial Databank (NEEDS-MONEY)	Financial databank	②	J/E	P/D/A	O/M	U.S. Europe
	World Economic Forecast Databank	Databank of international economic forecasts	②	J/E	P/D/A	O/M	U.S. Europe
	Nikkei Asian Corporate Profile	Basic Nikkei database on Asian companies	②	E	P/D/A	O/M	U.S. Europe
	NEEDS-CHINA	A databank system on the Chiniese economy	②	E	P/D/A	O/M	U.S. Europe
	CITIBASE	U.S. macro-economic and financial data	②	E	P/D/A	O/M	U.S. Europe
	BLUE CHIP	Forecasts on business conditions and money-rate indicators by 50 U.S. forecasting firms	②	E	P/D/A	O/M	U.S. Europe
	IMF Multilateral Trade Data	Trade data of about 160 countries in the world	②	E	P/D/A	O/M	U.S. Europe

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
Nihon Keizai Shimbun, Inc. (NIKKEI)	Nikkei Telecom (online database service available via personal computer) <Japanese Version>						
	Nikkei Telecom Japan Financial News & Data (Japanese Version)	Worldwide news and news-board of financial and market data	②	J	P/D/A	O	North-America Europe Korea Hong Kong Singapore
	Nikkei News Telecom	News, newsletters, searches of articles, encyclopedias, biographical registers and so forth	②	J	P/D/A	O	North-America Europe Korea Hong Kong Singapore
	Nikkei Telecom Management Information	News and management information	②	J	P/D/A	O	North-America Europe Korea Hong Kong Singapore
	Nikkei Telecom Industry & Technology	Trends in semi-conductor and IC industries, analytical data divided by industry	②	J	P/D/A	O	North-America Korea
	<English Version>						
	Nikkei Telecom Japan News & Retrieval	A comprehensive English language online service providing information on the Japanese economy, industry, market conditions, and companies	②	E	P/D/A	O	North-America Europe Korea Hong Kong Singapore
	Nikkei Telecom II Japan Financial News & Data	The same as the previous entry, but a new colour graphics capability has been added, and the news and market information has been expanded	②	E	P/D/A	O	North-America Europe Korea Hong Kong Singapore
Industrial Bank of Japan, Ltd. (I. B. J.)	IBJ Financial Data File	Financial data on companies listed on the first section of the TSE	②	E	P	M	U.S. Canada
Marketing & Research Corporation (M & RC)	DCF	Directory of Japanese medical doctors and facilities	③	J	P/D	M	
Dataquest Japan Limited (DQ Japan)	Online Information on Semiconductor	Prices, lead-time information, pricing trend analysis, and market intelligence	②	E	P	O	
Nippon Statistics Center Ltd. (NSC)	Nationwide Cities, Towns, and Villages Database	Socio-economic indicators on the areas divided by cities, towns and villages in Japan	②	J	P/D	M	
	Metropolis Sphere Micro Database	About 150 items of socio-economic indicators on cities, streets, and sections in Tokyo, the Kinki Sphere, and local central cities	②	J	P/D/A	M/C	

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
Japan Patent Information Organization (JAPIO)	Japan Patent and Utility Model	Published and public patents and utility models in Japan	①	J	P/D	O	Europe Asia U.S.
	Japan Design	Registered design in Japan	①	J	P/D	O	Europe Asia U.S.
	Japan Trademark	Applying and public trademarks in Japan	①	J	P/D	O	Europe Asia U.S.
	Japan Patent	Published patents in Japan	①	E	P/D	M	U.S.
JMA Research Institute Inc. (JMAR)	Market Search	Reference to the reports of marketing research	②	J	P	O	Europe U.S. (where HINET is distributed)
Nomura Research Institute	NRI/E	Macro economics in Japan	②	E	P	O/(M)	U.S.
Personal Business Assist Inc. (P. B. A.)	PCOM-HOST	Examples of operations of communication soft-wares	③	J	P	O	Korea
Heiwa Information Center Co., Ltd. (HIC)	Techno-Search	A database on industry and technology that collected and summarized the articles on new products, development of new business from five newspapers : Kagaku Kogyo Shimbun, Denpa Shimbun, Nikkan Kogyo Shimbun, Nihon Kogyo shimbun, and Joho Sangyo Shimbun	②	J	P/D	O	Europe
THE YOMIURI SHIMBUN (YOMIURI)	The Yomiuri Shimbun Database	Collection of articles from the Yomiuri Shimbun and Yomiuri Keizai Keizai Shimbun	③	J	P	O	
INTERACTIVE DATA CORPORATION TOKYO BRANCH (IDC)	NRI/E	Macro-economic, financial, and industrial data in Japan	②	E	D	O	U.K. North-America Germany Others
INTEC Inc.	Investment Data System	Security data in Japan, for overseas Japanese security-firms and their customers	②	E	A	O	U.S. Europe Hong kong Others
N.I.F. Corporation (NIF)	Asahi Shimbun Articles	Collection of articles from the Asahi Shimbun	③	J	A	O	
	Yomiuri Shimbun Articles	Collection of articles from the Yomiuri Shimbun	③	J	A	O	
	NICHIGAI ASSIST	Information from database WHO,BOOK,MAGAZINE, and MANAGEMENT	②/③	J	A	O	
	Mainichi Shimbun Articles	Collection of articles from the Mainichi Shimbun	③	J	A	O	
	Kyodo News Connected Database	Collection of articles from Kyodo News Service and its associates; Kumamoto Nichinichi Shimbun,Shizuoka Shimbun,and Nishi Nihon Shimbun	③	J	A	O	
	Tokyo keizai Industrial Information	Industrial information	②	J	A	O	
	Industrial News	News release announced by industries and government offices	②	J	A	O	

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
N.I.F. Corporation (NIF)	USIA Wireless File	Reports from U.S. government offices, provided by USIA	②	E	A	O	
	ASAHI ONLINE DATABASE	A database of the AsahiEvening News and AsahiEvening News Service,written i n English	③	E	A	O	
	Tokyo Financial Wire	Financial, economic, and industrial information in Japan	②	E	A	O	
	Industrial Monitor	Monitor news on industries,technologies,and others in Japan	②	E	A	O	
	Business Analysis	Interpretative articles on trend analysis into economics and industries in Japan	②	E	A	O	
	Weekly Economist Newsboard	Collection of all articles in the economic magazine,"Economist"	②	J	D	O	
	Asian Information Newsboard	Business information related to Asian countries, e.g. NIES,ASEAN	②/③	J	A	O	
	Event Convention Information	Information on events, conventions,and exhibitions held in Japan	③	J	D	O	
	I've Found Good Books	Newly published books	③	J	D	O	
	Pia video Information	Newly released videos	③	J	D	O	
	Mainichi Daily News	Online newsboard in English	③	E	A	O	
	Stock Price Newsboard	Stock market information from Tokyo Stock Market listed companies and foreign stocks	②	J	D	O	
	Mainichi Shimbun Newsboard	Online newsboard	③	J	A	O	
	Asahi Shimbun Newsboard	Online newsboard	③	J	A	O	
	Kyodo News Newsboard	Online newsboard	③	J	A	O	
	Yomiuri Shimbun Newsboard	Online newsboard	③	J	A	O	
	The Teleputing Hotline	News concerning communication and information	③	E	D	O	
	Tokyo Survival Guide	Tokyo guide written in English	③	E	D	O	
Japan Association for International Chemical Information (JAICI)	Quantum Chemistry Bibliographic Data	International literature on quantum chemistry abinitio calculation	①	E	D/A	M	Europe U.S.

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
KINOKUNIYA COMPANY Ltd.	BOOK	Information on the contents of books published in Japan	①/②/③	J	D/A	O/C	U.S. Europe
	MAGAZINE	Articles from 1,300 magazines published in Japan	①/②	J	D/A	O	U.S. Europe
	MANAGEMENT	On-line version of the encyclopedia of management business "Gendai Business Taikei"	②	J	D/A	O	U.S. Europe
	WHO	Personal information on those extracted from newspapers,magazines,and books published in Japan	③	J	D/A	O	U.S. Europe
	PRIZE	Information on prizes winners and prizes in Japan	③	J	D/A	O	U.S. Europe
COMLINE International Corporation (COMLINE)	Asahi Online Database	Collection of articles from the Asahi Shimbun and the Asahi Evening News	③	E	D	O	U.S. Europe
	USIA Wireless File	News released from USIA	③	E	D	O	U.S. Europe
Information Services International-Dentsu, Ltd. (ISID)	Jiji Securities	Daba on stocks and bonds listed on the Tokyo and Osaka exchanges	②	E	D	O	80 countries in the world
	NRI/E	About 4000 itmems on economics (macro,semimacro), industries,and current prices in Japan, listed chronologically	②	J	D	O	80 countries in the world
NISSHO ELECTRONICS CORPORATION (NELCO)	Diamond Companies' Staff List File	Personal information on directors and executives in listed or popular companies	②	J	D/A	M	
	Physicians and Medical Facilities File	Personal information on Physicians and information on medical facilities in Japan	②	J	A	M	
	Dentists' File	Personal information on dentists in Japan	②	J	A	M	
AT & T Jens	NIFTY-Serve CompuServe		②/③	J/E	T	O	U.S.
The Japan Information Center of Science and Technology (JICST)	JOIS						
	Nikkan Kogyo File on New Technology and Products in Japan	Database of the Nikkan Kogyo Shimbun (industrial newspaper)	②	J	D	O	U.S. Germany U.K. Korea
	STN						
	MEDLINE	Worldwide database of medical literature,produced National Library of Medicine	①	E	D	O	U.S. Europe U.K. Others
	FSTA	Bibliographic database containing the literature in food science and food industry in general	①	E	D	O	U.S. Europe U.K. Others
	CABA	Worldwide database of agricultural and related literature, after 1973	①	E	D	O	U.S. Europe U.K. Others

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
Japan Weather Association (JWA)	Maritime Weather Reports	Weather reports on the North Pacific Region	③	O : Numeric	D	M	U.K. China
	Weather Satellite Data	Analyzed data from the NCAA and Himawari weather satellites	③	O : Numeric	D	M	U.K. China
	Weather Satellite Imagery	Image data from the NCAA and Himawari weather satellites	③	O : Numeric	D	M	U.K. China
Japan Patent Information Organization (JAPIO)	INPADOC	Data on patents in 56 countries	①	E/O	D/A	O	Europe Asia U.S.
Heiwa Information Center Co., Ltd. (HIC)	COSMOS 2	Summarized data on 900,000 firms in Japan	②	J	D	O	Europe U.S.
	The Daily Industrial News Database	Collection of articles on new products, trends of R & D in science and technology,et al. from the Daily Industrial News	③	J	D	O	Europe U.S.
	The Asahi Shimbun Database	Collection of almost all articles from the Asahi Shimbun	③	J	D	O	Europe U.S.
	The Mainichi Shimbun Database	Collection of major articles from the Mainichi Shinbun	③	J	D	O	Europe U.S.
	The Yomiuri Shimbun Database	Collection of almost all articles from the Yomiuri Shimbun and Yomiuri Katei keizai Shimbun	③	J	D	O	Europe U.S.
	AERA Database	Collection of all articles from weekly magazine "AERA"	③	J	D	O	Europe U.S.
	Industrial News	News released by industries, government offices, and various associations	②	J	D	O	Europe U.S.
	Jetro Ace	Collection of reports and other materials from 80 overseas points of JETRO	②	J	D	O	Europe
	Information Newsboard on Asian Countries	Micro-information directly related to the business in Asian countries	②	J	D	O	Europe
Heiwa Information Center Co., Ltd. (HIC)	Industrial and Technical Information on China	Collection of articles on industries and technologies, extracted from newspapers published in China	②	J	D	O	Europe
	Market Search	Reference to the marketing research into all industries in Japan	②	J	D	O	Europe
	Title Search	Table of contents of industrial and technological magazines issued in Japan	①	J	D	O	Europe
MARUZEN CO., LTD.	J-BISC Others	CD-ROM version of "JAPAN/MARC", database of catalogs on books published in Japan	①/②/③	J	D	C	U.S. U.K. France Canada Others
USACO Corporation (USACO)	Actinomycetes Antibiotics Database	Data on antibiotics	①	E	A	M	Germany Italia U.S. Korea

Company Name	Database	Description of Database	Subject	Language	Status	Format	Main Countries
LEGAL-ROM SO-HANBAI CENTER Co.	LEGAL-BASE (All judicial precidents in summaries ROM)	Collection of summaries of all judicial precidents	③	J	D	C	
	LEGAL-BASE (All judicial precidents in full text ROM)	Addition of <reason> to the above ROM	③	J	D	C	
	LEGAL-BASE (All judicial precidents in full text, civil and commercial laws)	Extraction of the area of the criminal laws from the above ROM	③	J	D	C	

Table 5-3 Japanese Databases Planned for Overseas Expansion

Subject: ① Science and Technology ② Economics, Business and Finance ③ General or Others

Language: J: Japanese E: English O: Others

Vendor Status: P: Producer D: Distributor A: Agent T: Telecommunication

Format: O: On-Line M: MT, FD

Database Name	Description of Database	Subject	Language	Vendor Status
PROTON NMR Database (Tentative Name)	NMR Spectrum data for 8,000 organic chemicals	①	E	O
KINODIAL (F-BOOK)	Order entry system for foreign books, covers approximately 500,000 publications	①/②	E	O
CD-NET in English (Tentative Name)	News, products, company and statistical information on Japanese chemical industry	②	E	O
Company Information Database (Tentative Name)	Information on Japanese companies dealing with high-tech products	③	E	O/M/C
SCI	Consumer family panel research	②	E	M
SDI	Drugstore panel research	②	E	M
MICSCAN	POS monitoring panel	②	E	M
Capital Markets in Asia and Pacific Region Database	Contribute the development of the database owned by the University of Rhode Island	②	E	O
Atomic Bomb Document Database (Tentative Name)	Document information on atomic bomb	②	E	
COSMOS 2	Descriptions of Japanese 900,000 companies	②	J	O
TDB COSMOS 2 JAPAN	Descriptions of Japanese 50,000 companies	②	E	O/M/C
LEX/DB	Full-text database of 105,000 legal documents including laws, precedents, and case studies	③	J	O
BRANDY	Information for similar trade marks and trade names identification	①	J	O
ABC Circulation Report	Information on the circulation of the newspapers and journals	②	E	M
EDMC	Consumption, supply, demands, price, transportation, company index, taxation, and facility installation information of energy industry	②	J/E	O
Shipping Register File	Specifications of approximately 9,000 Japanese ships with more than 100 tons	②	J/E	M
C&C-VAN Database Service	On-line services of newspaper articles, company information, and marketing	②/③	J	O
(Not Decided)	Information on phermaceutical products	①	E	O
Japan Patent File	English version of published information on Japanese patents	①	J	O
Data Base Index in Japan	Introduction of Japanese databases	①	J	O
Anatomy Database	Information on anatomy	③	J/E	C
DIALINE	JAPAN/MARC and 15 other files	③	J/E	O
The Daily Yomiuri Article	Articles of "The Daily Yomiuri" emphasizing the columns	③	E	O

1.2 Problems Encountered by Database Services in Globalization

Answers to the question on what sort of issues arise while providing database services for overseas use, disclosed a variety of points, which are summarized as follows:

1) Distribution channels including provision of user-support services and agreement with overseas users or distributors,
2) Cost, quality, and speeds of translation for databases and user manuals,
3) Variety and uncertainties of over-seas user's information needs,
4) Unavailability of on-line terminals with Japanese language processing capability in overseas marketplace and difficulty in obtaining maintenance services for these terminals,
5) Shortage of Japanese databases attractive for overseas users,
6) Poor telecommunication environment including the lack of standardization for modems and modular-jacks,
7) Uncertainties about the profitability of overseas services, and
8) Others.

2. International Trends Surrounding Japanese Information

2.1 Collection and Utilization of Japanese Information in Europe and the U.S.

In Europe and the U.S., the efforts have been continued to augment their policy of collecting and utilizing scientific, technical, and industrial information on and from Japan.

(1) The U.S.

In compliance with the Japanese Technical Literature Act, enacted in 1987, the U.S. Department of Commerce established the Japanese Technical Literature Bureau, which started coordinating collection and monitoring of Japanese technical information in the U.S. The Bureau publishes a newsletter named "Japanese Technical Literature Bulletin" for an increasing number of readers, and has achieved substantial results, such as the editing of a Japanese technical information source handbook, and undertaken an investigation into the availability of Japanese gray literature. This Bureau was reorganized in 1989/90 accounting year and renamed to Japanese Technical Literature Program (JTLP).

On the other hand, the Acquisition Program of Japanese Technical Documents, an NTIS project of the Department of Commerce, indicates the steady expansion of cooperation with Japan, 18 national institutes under the Agency of Industrial Science and Technology and the Science and Technology Agency, with 22 private enterprises offering technical literature to the NTIS database. According to the U.S. report, there are already 15,000 pieces of literature input and many requests for duplication.

Japan and the U.S. are to offer well-balanced access for utilization of information in compliance with the US-Japan Agreement on Cooperation in Research and Development in Science

and Technology concluded in June 1988. Japan is in the process of augmenting the collection and production of database of public literature which is not readily available. The National Science Foundation (NSF) newly started in 1988 "Japan Initiative," which is a strengthening in the exchange of research scholars with Japan. The National Academy of Science and Engineering established new section, a Japan Office in March 1988.

In response to these public policies, leading enterprises, universities and colleges, and industrial organizations have designated a "technical gate keeper" exclusively in charge of Japanese information while augmenting particular contacts with Japan, personnally and organizationally.

In contrast with these efforts, three Japanese information programs have recently failed in the U.S. The first was JTIS (Japanese Technical Information Service) of UMI (University Microfilm International). Both the subscription service for monthly journals and on-line service via DIALOG were closed in 1989. The second was JTIRS (Japanese Technical Information Research Service) of George Mason University, which was a reference service for Japanese technologies. The third was the Japanese information newsletter of the U.S. Electronic Industries Association. All three of these programs were forced to close due to failure of obtaining sufficient users. It has been reported that the content and form of information supplied did not match to the needs of users. This fact implies that the supply of Japanese information is not so easy in spite of latent needs.

(2) United Kingdom

The Department of Trade & Industry is augmenting a system to assist the private sector concerning utilization of Japanese information and its Export To Japan Unit is offering a consulting service to private enterprises. This Department held a Japan Information Fact-finding Seminar at Sheffield University in conjunction with the private agency in May 1989.

Japanese Information Service of the British Library continues to play a key role in reference services related to Japan in England. This service deals with questions from not only domestic users but also foreign users in the Commonwealth of Nations by using both literature information and on-line databases. Among the inquiries which amounted to 90 a month, 55% was for business information, 14% statistical information, and 10% was related to Japanese enterprises which have advanced into Europe.

(3) Federal Republic of Germany

In West Germany, seven large public organizations like Hanover Technical Information Center (TIB) are collecting Japanese literature. As regards serial publishing, the German Periodical Data Bank offers access to Japanese magazines stored in Germany. Japanese periodicals currently stored in the seven centers amount to some 6,000 titles. As a result of the operation start of STN International in 1987, requests can now be made on-line for reproduction of articles stored in TIB and Medical Library at Cologne.

These seven centers handle 80% of the requests for Japanese literature presented via the German Inter-Library Loan System. Those requests which cannot be met within Germany are transferred to Japan,to the GMD Tokyo Office. They also handle inquiries from East European countries. The Japanese information collection and utilization system in Germany will be further improved in future. The current problems include the limited number of information specialists familiar with Japanese language and the low interest of end users in Germany.

(4) France

The Scientific and Technical Information Institute of the National Center for Scientific Research (CNRS/INIST) established a Japan Bureau in 1984. It performs collection and reproduction services, quick reference, and translation of Japanese scientific and technical information.

This bureau is in close cooperation with JICST and provides users with information broker service through direct access to Japan-made on-line databases, such as JICST/K, PATOLIS, Nikkei TELECOM and HINET. The Center is scheduled to move to Nancy, Lorraine in 1991.

(5) Sweden

Scandinavian countries have serious interest in Japanese information. Nordic DB Project was started in four Scandinavian countries in January, 1988, to collect Japanese information for sharing of information from Japan-made on-line databases. The Research Policy Institute of Lund University in Sweden is operating the modern East Asia information policy program on Japan, Korea, China and India, and utilization of Japanese information is one of the key issues of the program. Currently, direct access is made to Nikkei TELECOM (both English and Japanese) of NIHON KEIZAI SHIMBUN, Inc., HINET of the Heiwa Information Center Co., Ltd., COSMOSNET of TEIKOKU DATABANK, Ltd. The articles of newspapers and magazines of Electronic Library, Inc. and PATOLIS of JAPIO for patent information. Also currently undertaken has been an experiment in machine translation of Japanese literature on a personal-computer level and a full-scale plan is under review.

The Office of Science & Technology Counsellor (STATT), Sweden distribute reports from its staffs in the U.S., U.K., Germany, France, USSR, Japan, China, India and EC in the form of a "Foreign Report" while undertaking an intermediate service for local databases. For example, various information retrieved in Tokyo are distributed within Sweden for utilization in specific businesses of trade, technology transfer, personnel exchange and investment.

(6) The Netherlands

Amsterdam is not only a center of the Netherlands economy, but also a center of financial information in Europe. In view of the recent growth in the necessity of strengthening relationship with Japanese economy and enterprises, the Amsterdam City Counsel (BIT) and the Amsterdam Financial Gateway Foundation have jointly performed a feasibility study on the establishment of a Japanese information access point in Amsterdam. The study was actually

carried out by a consultant company called MINDZ Associates. This is a research and consultant company with Japanese linguistic capability, and starts Japan Monitoring Service (JMS) from October 1989. The following reasons exist in the background of the above activity: (1) Lack of access to Japanese information sources, (2) Dubious quality in Japanese information currently available, (3) Slowness to obtain Japanese information and (4) Excessive generalization of the information content and the incompatibility with individual needs.

This program covers the following fields : (1) Market and business data, (2) Economy and economic policy, (3) Financial information, (4) Securities information and (5) Consumer behavior. At present, information users in Amsterdam can acquire Japanese information by (1) direct inquiry, (2) via the trade association of the Netherlands and Japan, (3) through specialized magazines in Western languages, etc. Database utilization is ranked in the 14th position in the 19 kinds of methods as listed.

(7) Hungary

Interest in Japanese information is increasing as a result of rapid progress in the political change in East Europe. However, the needs and particular use situation ought to be studied further in the future. The International Cultural Center in Budapest wishes to establish an information center concerning Japanese sciences and technologies. It is also scheduled to organize the second meeting of the European-Association of Japanese Resource Specialist (EAJRS) in Budapest in September 1990. Though some Hungarian specialists have experience of database utilization in specific fields like chemical abstracts, payment of the utilization fees in hard currency is practically impossible, and barriers in utilization are still high.

In East European countries, growing interest is rayed on Japanese information in all fields of science and technology, economy, industry and corporate management.

2.2 The 2nd International Conference on Japanese Information

For the period from October 23 to 25, 1989, the 2nd International Conference of Japanese Information on Science, Technology and Commerce was held in the Japan-German Center in Berlin. The Conference was organized by the German National Research Center for Computer Science (GMD) jointly with the Berlin Japan-Germany Center (JDZB) and Berlin State Library (SPKB). Other sponsors include NTIS of the U.S. Department of Commerce, the Japanese Information Service of the British Library, FIZ Karlsruhe (West Germany), JICST (Japan), NACSIS (Japan) and Database Promotion Center (Japan).

The prior 1st meeting was held in Warwick University of England in September 1987. In the second meeting, a total of 150 panelists including specialists in Europe and the U.S. as well as specialists from public and private organizations in Japan exchanged information and held discussions concerning collection, utilization and evaluation of various Japanese information in Europe and the U.S. for two years after the first meeting. In this Conference, 42 papers were presented in ten sessions. In the course of the meeting, Japan, the U.S. and U.K. presented

reports on the overall trend of collection and supply of Japanese information. Then, position paper on the source of Japanese information were made by Japan, France, and West Germany. Also there was analysis and evaluation on patent and image information of Japan. As for utilization, the practical situation in leading U.S. enterprises (AT&T and Xerox), The British libraries, and libraries of U.S. universities were introduced. Also the report on current situation of machine translation was presented.

As a whole, Europe and the U.S. are deepening their understanding further on the supply system and problem factors in the availability of Japanese information. There were also acknowledging comments on the efforts of Japan concerning the new database services.

2.3 Database Utilization

Survey on needs and availability of contemporary Japanese information was made on European and U.S. participants to the Berlin Conference under the cooperation of GMD.

This survey was entrusted to the Japan Center for International Exchange by the Japan Foundation. Among the 60 effective replies, 37% were end users and 63%, intermediaries (librarians and information specialists). The high percentage of the latter was one of features of this survey. The geographical distribution of replies included 50 persons (83%) in Europe and 10 persons (17%) in the U.S. Organizations to which they belonged includes universities and academic institutes (32%), private enterprises and organizations (22%), governmental and public organizations (25%), research organizations (12%) and others.

What means are taken and what means will be taken to search Japanese information?

One third of respondents replied that they were using Japan made-databases while two thirds replied that they wished to use them in the future. Retrieval through printed materials and personnel contacts are two major means, but a strong expectation on databases can be recognized.

Table 5-4 Means to Obtain Japanese Information

	Present	Future
Reference bibliography (published in Japan)	59.6	64.8
Reference bibliography (outside Japan)	61.4	59.3
Database (Japan made)	33.3	66.7
Database (foreign made)	38.6	42.6
Personnel contact (in Japan)	52.6	72.2
Personnel contact (local)	57.9	57.4

When searching Japanese information, 47.4% of respondents replied that they used databases while 52.6% replied they did not. Most of latter respondents pointed out economic reasons of "expensive telecommunication cost" (33.3%), "expensive fees" (30%), for their not utilizing databases, and 26.7% of respondents replied that they did not know the location of the appropriate databases. On the other hand, the percentage was small for respondents who replied that data in English both of abstract and text were few. The image of database utilization by specialists of Japanese information may be illustrated as shown in Figure 5-1.

This figure shows that there exists a considerable number of users who may use databases including Japan-made databases only if conditions are satisfied. As the source of original Japanese literature information, 67% of respondents relied upon local libraries and information centers and the percentage dependence on Japanese library information centers like JICST was 30%. As many as 42% of respondents replied that they have personal contact with Japan, which indicates that many specialists have direct contact with Japan.

As regards the present Japanese information distribution system, 15% of respondents replied "extremely satisfied", 37% "more or less satisfied", thus 52% of the total were "satisfied". Among the reasons which respondents with the reply of "unsatisfied" presented, the highest percentage went to "appropriate information location not known", followed by "complicated procedure", "high cost", "long wait time" and "lack of adequate advice service" in this order.

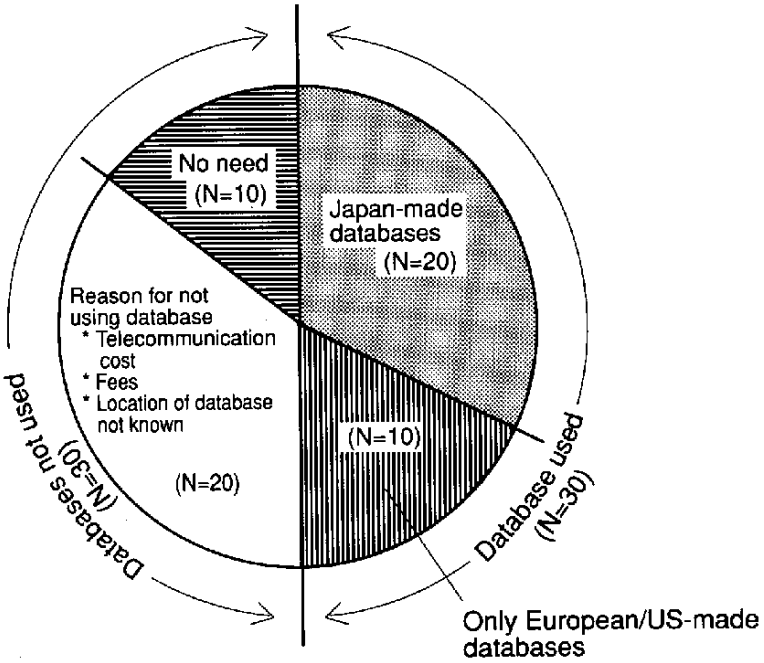


Figure 5-1 Database Utilization by Specialists of Japanese Information (N=60)

Source : Prepared from the survey by The Japan Foundation in the Berlin Conference in October, 1989.

Concerning the degree of interest by subject, the environment and resources occupied the highest percentage followed by physics, electronics and patents, in the science and technology field. More than a half of replies were positive of necessity in all fields. In the social science field, the interest was the highest in business and management followed by economy and politics.

Thirty-one persons of those covered by the Berlin survey could understand Japanese. Those persons are, therefore, the core specialist group as users of Japanese information. There exists a much wider group of latent users behind this group, but the needs and utilization pattern of this latent users group need to be defined in future surveys.

Comparison of the survey in 1987 at Warwick with those of Berlin in 1989 leads to several interesting points. Both surveys handled Japanese information specialists while covering 60 persons each.

There exists almost no difference in the kind of information used, but the utilization ratio of patents and proceedings were low in the Berlin survey. This may be due to sample differences. The major means to search Japanese information was printed materials (60%, nearly equal in both surveys), but the utilization ratio of databases was lower in the Berlin survey. This may be attributed to the fact that samples from social and human science fields were slightly higher in percentage and less Americans were included in the case of the Berlin survey. This Berlin survey shows that more than half of the respondents exploited the personal contacts, implying that the personal network is active among information specialists including Japanese. There is not much difference in the database utilization frequency between the two surveys. Since Japanese information is unique in characteristics, no special heavy user has not yet appeared in the case of literature type information.

The number of users of the science and technology literature database (JOIS/STN) has leveled off, but the number of users of Nikkei Telecom has increased in these two years. As though the number of uses in searching Japanese information through European and the U.S. databases (DIALOG, Data Star, etc.) is decreasing, this is a phenomenon observed among Japanese information specialists with ability of understanding Japanese. The percentage dependent on the familiar European and the U.S. databases is considered generally high. This point cannot be definitely be concluded unless a wide-ranging survey of general users is conducted.

The utilization ratio of the Japanese patent information service offered by Pergamon has also leveled off. Utilization of patent data requires special knowledge and experiences and the users group of this kind of information is considered rather fixed.

Table 5-5 Interesting Subject (Percentage Component)

Field	Necessary			Not necessary	No reply	Grand total (N=60)
	Extremely	More or less	Total			
a. Social Science						
1. Politics	31.7	25.0	56.7	23.3	20.0	100.0
2. Law	16.7	31.7	48.3	26.7	25.0	100.0
3. Economy	38.3	25.0	63.3	18.3	18.3	100.0
4. Business and management	41.7	28.3	70.0	10.0	20.0	100.0
5. Labor	13.3	31.7	45.0	28.3	26.7	100.0
6. Society	16.7	28.3	45.0	27.6	28.3	100.0
7. Education	11.7	35.0	46.7	26.7	26.7	100.0
8. Others	8.3	0.0	8.3	0.0	91.7	100.0
9. Total	22.3	25.6	47.9	20.0	32.1	100.0
b. Humanities						
1. History	20.0	25.0	45.0	30.0	25.0	100.0
2. Philosophy and social ideology	20.0	20.0	40.0	31.7	28.3	100.0
3. Religion	16.7	18.3	35.0	36.7	28.3	100.0
4. Literature	15.0	23.3	38.3	35.0	26.7	100.0
5. Japanese and linguistics	23.3	23.3	46.7	25.0	28.3	100.0
6. Art	15.0	21.7	36.7	33.3	30.0	100.0
7. Others	1.7	0.0	1.7	0.0	98.3	100.0
8. Total	16.0	18.8	34.8	27.4	37.9	100.0
c. Scientific and Technology						
1. Patent	48.3	16.7	65.0	15.0	20.0	100.0
2. Medicine and chemistry	35.0	16.7	51.7	18.3	30.0	100.0
3. Physics and electronics	51.7	13.3	65.0	13.3	21.7	100.0
4. Engineering and construction	43.3	15.0	58.3	16.7	25.0	100.0
5. Space, earth and ocean	30.0	25.0	55.0	15.0	30.0	100.0
6. Environment and resources	38.3	33.3	71.7	10.0	18.3	100.0
7. Metallurgy and materials	50.0	5.0	55.0	18.3	26.7	100.0
8. Others	15.0	0.0	15.0	3.3	81.7	100.0
9. Total	39.0	15.6	54.6	13.8	31.7	100.0

Source : Prepared from the survey by The Japan Foundation in the Berlin Conference in October, 1989.

Table 5-6 Comparison of Previous Surveys

	Warwick Conference (1987)	Berlin Conference (1989)
A. Kind of Information Used	(%)	(%)
1. Books	60.0	61.7
2. Magazines or thesis	90.0	86.7
3. Patents	61.7	38.3
4. Technical report	71.7	66.7
5. Minutes	76.7	35.0
6. Newspaper articles	56.7	58.3
7. Enterprise financial information	43.3	33.3
8. Statistics	48.3	38.3
B. On-line Utilization Means	(%)	(%)
1. Printing-out search results	65.0	
Japanese		59.6
Other than Japanese		61.4
2. On-line database	56.7	
Japan-made		33.3
Other than Japan-made		38.6
3. Information broker	21.7	
Personal contact (Japan only)		52.6
Personal contact (Other than Japan)		57.9
C. Utilization Ratio of Database	(%)	(%)
1. 6 or more per month	25.0	27.0
2. 1~5 per month	35.0	20.3
3. Scarcely used	21.7	16.9
4. Not used	15.0	35.6
D. Database Used	Unit (%)	Unit (%)
1. JOIS	14 (40.0)	11 (39.3)
2. STN	5 (14.3)	8 (28.6)
3. NIKKEI, Telecom	3 (8.6)	10 (35.7)
4. DIALOG	20 (57.1)	12 (42.9)
5. ORBIT	4 (11.4)	—
6. Pergamon	7 (20.0)	7 (25.0)
7. EL	—	5 (17.9)
8. HINET	—	3 (10.7)
9. COSMOS	—	3 (10.7)
10. BRS	2 (5.7)	3 (10.7)
11. Data Star	9 (25.7)	3 (10.7)
12. NEXIS	—	2 (7.1)
13. LEXIS	—	2 (7.1)

Source : Data obtained from the survey by Japan Database Association at the Warwick Conference in September 1987 and the survey by The Japan Foundation in the Berlin Conference in October, 1989.

3. International Cooperation in ASIA

There are countries in the Asian region, which may be classified into various categories, such as those called NIES which are in the process of transforming into industrial countries with the target of becoming industrialized economy, and those called developing or underdeveloped countries which have more distant targets in achieving modernization. In this situation, each country is striving for well-coordinated national development and regional cooperation.

What is indispensable to such task is to understand the present state of the country correctly and to review and put into relevant policies for the improvement and expansion of statistics and information on industries, economy and technologies. Also recognized is the importance of collection and analysis of data and information of neighboring and other foreign countries. Besides the improvement and expansion of such data and information an index is needed to measure the degree of advance of such a country and the promotion of informatization should be pushed forward actively.

Such promotion of informatization is executed mainly under cooperation and assistance of international agencies and industrialized countries, but certain aspects exist which do not comply with the actual state of the country. In this circumstance, the Database Promotion Center has performed research under the contract with MITI on promotion and cooperation with respect to databases, which can form core element of informatization of the country. This chapter describes the outline of the research.

3.1 Malaysia

Malaysia is a country with active computer utilization, next to Japan, Singapore, and Korea. The entities which utilize computers most includes government agencies. Typical administrative systems are SETIA (economy-related system jointly operated by four ministries and agencies) and SMPKE which is management information system, MIS for higher management, and accessible from 360 terminals of 24 ministries and agencies. The government is developing the promotion policies of information technology with the intention of promoting information-oriented trends. The telecommunication infrastructure is also under improvement and expansion within the country and the use of packet networks and ISDN is underway.

In the private sector, the banking network is the largest database compiler and user. There are three of Malaysian, Chinese and Arabic networks currently offering services independently. POS is in the early stage of introduction in department stores.

The database service industry is not yet to develop. There is one distributor of credit and business information and one Videotex service (TELITA) under cooperation with England.

3.2 Thailand

The database industry is not yet to develop and will depend on the use of computers in future. Principal computer users include government ministries and agencies as in the case of other developing countries, and, according to authorized source, 254 governmental organizations have already introduced 206 computers. Thirty-seven organizations have introduced mainframes while 139 have installed minicomputers and microcomputers.

Typical applications of database utilization include narcotics control, personal history of tourist jointly with Australia, laws, and judicial decisions of the supreme court started in 1983 etc., although these systems are exclusively for internal use. There is also a database system for bibliographic data of universities. As for utilization of overseas databases, CD-ROM version of MEDLINE has been introduced. However, the scale and data volume of these systems are still limited. Typical private sector service is the database of Asian Institute of Technology (AIT) which stores some 60,000 bibliographic records covering geology, energy, environment, hygiene, etc., serving 144 users.

3.3 Indonesia

The trend toward informatization is pursued mainly by ministries and agencies of government including universities utilizing 31 databases. Eight of these databases which contain mainly statistics have been made to the public.

Development and utilization of databases is being pushed forward in the Departments of Industry, Agriculture, Technology, Communication Corporation, Agency of Technology Application and Evaluation, Agency of Investment Coordination, Bureau of Statistics, Department of Health, and University of Indonesia.

There are 11 databases offering services in the private sector, six of which are on foreign information. Databases generally accessible include those of the Bureau of Statistics, domestic and overseas information on product and corporation of the World Trade Center which has 1,000 users, and economy and technology information of Bistinfos, British-Indonesian Science and Technology Information Center under cooperation of England. Services are provided mainly through on-line mode and off-line floppy disk and print out materials.

Many problems exist in dissemination of databases. In particular, collection of information in the private sector and the poor environment for efficient utilization of information. Difficulties still lie ahead for smooth pass toward an information-oriented society.

4. Tasks Ahead and Overview

4.1 Creating a New System in Public Sector

Overseas supply of information services is one of the means for much higher purposes, e.g. technology transfer, external trade and personnel exchange. It is necessary to tie up the efforts more closely with such specific activities. Some of public information service agencies

are making efforts to improve their overseas supply service system recently.

JETRO started improvement and expansion of information supply to its overseas offices in 1989, by installing a workstation in about 30 offices in Europe and the U.S. This program aims at to collect information on local enterprises that have interests in export to Japan. In parallel, JETRO plans to establish a Grass-roots International Center in 45 domestic JETRO trade centers within Japan, in order to provide local enterprises and consumers with various information concerning import from abroad. It is expected that information thus collected through these grass roots networks will be rapidly transmitted to overseas, thereby accelerating exports from foreign countries to Japan.

Patent information plays the most important role for international contribution through technology transfer. Japan, in this sense, bears heavy responsibility as the largest patent information resource in the world. On the other hand, there exists various requests from foreign countries on the current patent system of Japan in view of long time of the review period due to large application quantity and shortage of competent examiners, monopolistic supply arrangement of patent abstracts in English to western users, etc. In this situation, the Patent Office started a plan for fundamental change of operation of the patent system in 1988. Specifically, the plan calls for introduction of paper-less application procedure, increase of patent examiners, search subcontracting, request for strict screening of applications, and request to private sectors for the purpose of shortening the review period of patent and utility model. For paper-less application, the electronic application system will start operation in the fall 1990.

It is desirable for supplying patent information widely to overseas, to give foreign information service intermediaries representative agency rights to meet positively the strong demand for such information from foreign users. In this respect, an epoch-making decision was made in the Information Section of the Proprietary Rights Council of MITI in December 1989, to the effect that data of the Japanese Patent Office will be provided non-exclusively to information service intermediaries including foreign intermediaries in future. This decision was made during discussion concerning how patent information supply should function under the new paper-less system.

The new policy, including that of non-exclusive supply of public information of Japan to overseas private intermediaries as well as the introduction of the principle of competition, will not only prove extremely effective for solution of complaints of overseas users, but also exert influence on the way of the overseas information supply of other public information service agencies.

4.2 Problems of Supply Systems in Private Sector

Overseas supply service of Japanese information is a newly born business and not yet in a stage to recover their initial investment. Only a few years ago, it has been thought that there were latent demands for Japanese information and the start of supply was considered enough to cause rapid expansion of the market for Japanese information. In correspondence to such antici-

pation, several services were actually planned and put into practice. Certain doubts were presented, however, as to whether true needs for Japanese information existed since several pioneering services in the U.S. failed successively and test sales programs of Japanese firm failed to collect sufficient customers. Surveys were made several times by Japanese and American organizations during this period and the structure of demands and market has come to be defined gradually. The market differs between end users and intermediaries (e.g. libraries and information specialists). End users are further divided into a group that has direct contact with information sources in Japan and a group which does not. The former group includes researchers and the management of large enterprises which can access required Japanese information via direct personal contact or via subsidiaries or branch offices in Japan. Executive of small businesses who lack such contact or those who normally have no contact with Japan but face the necessity of studying Japan in terms of their business, must send inquiry to local intermediaries or agencies related to Japan. The information available also differs between those who are familiar with the Japanese language or can expect help from a person familiar with this language and those who have to search for Japanese information using only English information sources.

In addition, the utilization pattern differs depending on the pattern and characteristics of the information such as document or statistical data, real-time or retrospective information. In this way, the market structure of Japanese information would be not uniform, but be overlapped and diversified. Such market structure needs diversified entry methods and service patterns in response to respective needs. The future response should, therefore, be to build-up a local service system complying with market characteristics as described above.

For information specialists familiar with Japanese language such as librarians, information specialists, and gate keepers in charge of Japan of major enterprises, services through a local agency will be effective. It is essential for such an agency to have thorough knowledge on information sources in Japan, database services available, and technical specifications of Japanese language terminals. If a low quality of service is offered by such local agency or an unsatisfactory relationship with a Japanese supplier develops, this may cause further amplification of complaints regarding the Japanese information supply system in Europe and the U.S. This indicates the extreme importance of selecting the high-quality local agencies.

For the more numerous end users who search Japanese information mainly through resources in English, the use of existing database service networks in Europe and the U.S. will be the quickest way. It will be extremely convenient for general users in Europe and the U.S. not having knowledge on particular Japanese information sources if the required Japanese information is made available via western database service they are familiar with. Information providers in Japan, on the other hand, have to rely on local services entirely in Europe and the U.S. and thus cannot monitor directly the needs of end users.

Development of such a local service system will be a key factor governing the success or failure of formation and expansion of the overseas Japanese databases market in the future.

Trial-and-error and in-depth study will have to be made concerning what service system will be appropriate to Japanese information needs differing in content and pattern.

4.3 Counteractions of Japan

On Japanese side, there exist several issues which should be solved jointly by industries or under public assistance in parallel with efforts of individual agencies and enterprises. These issues are described below.

① Augmentation of advertisement: Public relations activities concerning the location and utilization method of Japan-made databases are not sufficient. Continuous participation in the On-line Meetings and exhibitions held regularly every year, with high reputation, in Europe and the U.S. should be recommended in view of Japanese service public relations.

② Supply of clearing information: One of reasons for complaints concerning Japanese information and database services in Europe and the U.S. is lack of knowledge on what kind of information is available from what source or what kind of service is available. It is, therefore, necessary to translate the database handbook and information sources into English. The English-version of database white paper and database directories are enjoying high reputation in foreign countries.

③ Supply of advisory service: It is necessary to establish and maintain an advisory and assistance offices in Japan in order to meet various inquiries from overseas.

④ Reduction of telecommunication cost: The international data communication cost to use Japan-made databases is expensive for foreign users and causes strong complaints. Certain systems (Nikkei, QUICK, etc.) have established their own dedicated service lines to principal cities in foreign countries, but users must bear the expensive international telecommunication cost when using other networks. There is also a strong demand for connection from the international packet switching network of Europe and the U.S. to the on-line database in Japan.

⑤ Machine translation: Performance improvement of machine translation systems between Japanese languages as English, German, French, Chinese, Korean, and Thai, should be pursued so that they may contribute to overcome language barriers.

VI. ACTIVITIES FOR PROMOTION OF DATABASES

1. Ministry of International Trade and Industry

To realize a highly advanced information society, it is essential to develop and improve the databases. In view of this, MITI is promoting the following policies:

1. Promoting important database production,
2. International cooperation regarding databases,
3. Tax system measures for corporations producing databases,
4. Supporting database production in the private sector,
5. Supporting system development for database operational efficiency,
6. Putting into practice Rules on Database Directory,
7. Conducting research on promoting of the production of databases,
8. Producing public databases and promoting provision of government-owned data to the private sector,
9. Producing all sorts of model information systems for swiftly meeting the needs from varied local community areas with respect to their industry, society, life, etc., and through such utilization, evaluating the system's serviceability, economy, plus the effects on industries and society. Also, MITI is promoting the New Media Community Plan to promote the production and operation of information systems, and their wide utilization.
10. Expanding SMIRS (Small and Medium Enterprise Information Research System) to increase the information networks for small and medium enterprises by connecting the Japan Small Business Corporation and Small and Medium Enterprise Regional Information Centers for the purpose of swift and efficient provision of information to small and medium enterprises.

2. Management and Coordination Agency

In every ministry and agency, the number of databases rises year after year, and, since 1980, the increase has been remarkable. This is due to the fact that information systems operation has become efficient and that the information needs from the users have been increasing. This in turn, has helped the progress of database technology and systematic handling of statistics and information developed the stock of various kinds of data files.

To promote the National Government databases, "Basic Plan on Establishing Database in the National Government" was agreed on in Dec., 1987 at the Inter-ministerial Council of

Secretariat Generals. Every ministry and agency are expected to improve their databases in accordance with this fundamental plan.

To promote the utilization of the Open System Interconnection in the National Government, it was decided in 1989 at the cabinet decision on Promoting Administrative Reform that the promotion of open system interconnection should be done as much as possible in accordance with the international standard. This is the first decision made by the Government with respect to the OSI and systems development is being done in accord with various ministries and agencies. The OSI which makes it easy for different kinds of systems to be interconnected, is expected to become a widely effective means for promoting the inter-ministry and inter-agency database utilization.

3. Ministry of Education, Science and Culture

To keep pace with the rapid progress toward an information society and to realize an ideal advanced information society, it is essential to improve the information infrastructure and also to promote the production of databases together with the improvement of the information distribution infrastructure such as networking, etc. The Ministry of Education, Science and Culture is strongly pushing ahead the various database productions such as scientific information, lifelong educational information, educational literature information, etc.

In April 1986, the NACSIS (National Center for Science Information System) was established to function as the joint utilization organization for universities all around the country, and to use this center as a network core to connect national, public and private university libraries nationwide, including computer centers. Thus, development of the Science Information System is being improved. In 1989, there has connection of the NACSIS and the U.S. National Science Foundation, and in 1990, connection of the NACSIS and the British Library was completed.

In order to increase a greater number of information specialists, the establishment of an information science faculty, an increase in the fixed number of students, and the establishment of an information center at national universities for the purpose of intensifying the information processing educational facilities, are being discussed. The National Institute for Education Research, National Education Center and the National Women's Education Center are producing various types of databases respectively.

4. Agency of Science and Technology

The fundamental policy with respect to Japanese science and technology information distribution is based on the idea of the NIST (National Information System for Science and Technology) which was reported to the No. 4 Consultation to the Science and Technology Meeting in 1969. The Agency of Science and Technology is doing the organizing work to real-

ize the NIST plan in cooperation with the ministries and agencies concerned and the information service organizations concerned.

On the basis of the Scientific and Technical Information Promotion Funds, promotion of researches related to databases, standardization and fostering of specialists related to science and technology databases, and database production and related technology development in the Japan Information Center of Science and Technology and in other related organizations are being carried out. The promotion of STN International and the international distribution of science and technology information regarding the new U.S. - Japan Agreement on Cooperation in Research and Development in Science and Technology are also being performed.

5. Ministry of Post and Telecommunications

Because of the recent development of telecommunication technology and the advancement in telecommunication networks, the needs for telecommunication services are becoming diversified. To meet this demand, the opening of telecommunication circuits, the enforcement of Telecommunication Business Law and the initiation of advanced communication services by Type II Telecommunications Business have been established. Also, the ISDN (Integrated Services Digital Network) has been provided since 1988. As a result, the infrastructure for the utilization of the on-line database services has been improved, but communication and access method and terminals differ according to each database. Thus, database distribution is being retarded by these complications. Therefore, MPT is taking every possible policy to enlarge database distribution.

Also, the Ministry is supervising the compilation of the On-line Database Directory to promote the utilization of on-line database services which provide necessary information through networks.

Moreover, the Ministry does research on and promotion of database distribution, conducts studies on databases in the ISDN age, and developments related to databases, provides data to InfoCom Research, Inc., and supports local information activities.

VII. LOCAL DATABASES

1. Policy for Local Information Society

The advanced metropolitan function is continually and heavily concentrating in the city of Tokyo. Especially information is concentrating in Tokyo, and as the information society advances, the information gap between Tokyo and other local areas poses serious problems. There is a move to decentralize the metropolitan function concentrated in Tokyo and to develop a multipolarized and decentralized nation. Tokyo should not be expected to have all the advanced metropolitan function, and local areas should be developed to assume more powerful strategic function, and thus Tokyo will be decentralized.

On the other hand, several ministries and agencies have as their information projects like the New Media Community Plan, Teletopia Plan, Green Topia Plan, Future Metropolis Information Plan, Intelligent City Plan, Hi-Vision Community Plan, Hi-Vision City Plan.

In local areas, they are beginning to recognize the importance of database promotion as an effective policy to develop infrastructure for an information society. Local utilization of databases is increasing and information dispatch from local areas by database production are greatly needed. In-house database production is also increasing and those databases are almost certain to become dispatch databases from local areas in the future.

2. Present Situation of Local Databases

Hokkaido is less advanced than the Tokyo Metropolis area and the Kansai area in the distribution of the databases. However, in October 1989, the Hokkaido Database study Group held the first Database Fair in Hokkaido and it was a great success.

In Tohoku area, the Tohoku Information Service Industry Association is discussing databases to be constructed there. It will be necessary to conduct promotional activities to enhance the public recognition and awareness of databases.

In the Tokai and Hokuriku area, in order to develop as an international industrial technology center area, the Tokai Hokuriku Database Promotion Association was established in 1987 and started the activities to promote the effective construction and distribution of databases.

In the Kansai area, the improvement in information networks acts as the foundation for the advanced information society. Thus, information equipment is progressing, and an increasing number of corporations are utilizing databases as their internationalization advances and their economic activities become more dynamic. The Kansai Database Association is undertaking powerful activities which include database development and distribution, study and training,

research and investigation, and making sevaral proposals.

In the Chugoku area, the Chugoku Area Database Promotion Council is working to enhance public database awareness, by research and promotion activity for local database production.

In the Shikoku area, the utilization of the databases is not yet widely practiced except for a few public organizations. Establishment of a database promotion organization is urgently needed.

In Kyushu area, the Database Promotion Committee of the Kyushu is trying to enhance public awareness as to the importance of the database utilization and distribution.

In the Okinawa area, which has 41 inhabited islands scattered extensively over the sea, the importance of combining these separated islands in terms of information is so great that the construction of an information system is being planned mainly for databases closely and typically suited to the area.

3. Society of Database Promotion Organization

To fill local gaps, a database promotion organization, based on industry - university cooperation, has been established and it is promoting database production. In addition, all local database promotion organizations are cooperating and the Society of Database Promotion Organization which was formed for the purpose of developing the dispatch function of local information. Thus organization aims to be independent from that of Tokyo Metropolis, and its first meeting was held on May 25, 1989 in Osaka. At this meeting, discussions were held in regard to items for coordination and cooperation, the exchanging of bulletins among member organizations, and other data related to databases. The second meeting was held on September 12, 1989 in Nagoya and reports presented regarding the present situation in each local area. The third meeting was held in June 1990 in Sapporo, Hokkaido.

DATABASE CONSTRUCTION AND TECHNICAL DEVELOPMENT PROMOTION PROJECT

Database Promotion Center, Japan (DPC) financially supports some private enterprises and industrial organizations for database and technical development.

DPC has provided this aid for two main purposes since 1984. The one is to promote the construction of databases which is socially, economically and internationally, important or essential for prosperity and promotion of regions and industries. The other is to activate research and development of database related technologies, which aims at increase of efficiency of production, distribution and utilization for databases.

Consigned project has been performed for 5 subjects in 1984, 18 subjects in 1985, 24 subjects in 1986, 29 subjects in 1987, 24 subjects in 1988, and 20 subjects in 1989. The number of subjects covering various fields from 1984 to 1989 has reached 120. Subjects contracted for 1989 are summarized as follows:

Subjects Contracted for Database Production and Technical Development for 1989

FIELD: Society

TITLE	Constructing a of database of climatic information
CONSIGNED COMPANY	Meteorogical Telecommunication System Inc.
CONTENTS	The harmful influences of changes in the earthly atmosphere which will affect not only our living environment but also industry generally are inestimable. To search for trends in such changes, a wide range of weather observation data and the statistically processed information is inevitable. New data will be saved in a opto-magnetic disk which features good cost performance enabling the system to offer information at low cost. Initially, the database constructed will accumulate climatic data covering all of Japan. Scheduled system upgrading will proceed by saving higher order processing data, and by realizing on-line access in the future.

TITLE	Constructing a database on environmental electromagnetic interference
CONSIGNED COMPANY	Kansai Electronic Industry Development Center
CONTENTS	Our purpose is to create a database which will be able to offer more appropriate information promptly through collection of information on environmental electromagnetic interference accumulated over the past 20 years, and by making retrieval easier. The main contents will be (1) each country's rules and standards for electromagnetic interference, (2) technical data of parts and materials for electromagnetic interference countermeasures, (3) conference materials, magazines, newspapers, thesis concerning electromagnetic interference, and (4) both domestic and overseas information on public and private test organizations. The aim is to connect this database and a retrieval system to personal computers via public telephone lines so that users can obtain the necessary information promptly.

TITLE	Constructing a thesaurus of information on disasters
CONSIGNED COMPANY	Laboratory of Urban Safety Planning
CONTENTS	"Database of information on disasters" is one which many specialists of various fields require for the aim of preventing accidental disasters and to contribute to future technical development. This database is scheduled to be publicly demonstrated as an on-line system by April 1990. This survey is to a create a keyword thesaurus which will be required for the demonstration.

TITLE	Constructing a database and a communication system for medical evaluation focusing on meaningful information
CONSIGNED COMPANY	Computer Convenience Inc.
CONTENTS	To supply high-quality medical treatment at low cost and to maintain or recover health, it is necessary to provide a self-management system so that an invidual can control his own health and maintain his life style at a regular rhythm. This fiscal year, the database containing meaningful information was constructed focusing on the following three kinds of data: (1) non-verbal description data (psychological-level data) (2) 1/f fluctuation of heart rate data (physiological-level data) (3) individual health/life style pattern data. Also, the software necessary for forming a communication system was developed. Real data were collected, analyzed and partly constructed into a database, and then a prototype system was built.

TITLE	Constructing a life-support database on information required by handicapped persons
CONSIGNED COMPANY	Dial Service Co., Ltd.
CONTENTS	In 1987, we began to creat "life-support databases" and supply information based on the databases to nationwide 3 million handicapped persons and their families, volunteers and social welfare enterprise organizers. In fiscal 1987, system design was completed. From fiscal years 1988 to 1989, 16,000 pieces of information including those on volunteer, welfare equipment, life, leisure and so forth were collected and constructed on the basis of a survey of the needs of 50 various handicapped persons.

TITLE	Constructing a database system on museum information
CONSIGNED COMPANY	Japan Science Foundation
CONTENTS	For the purpose of activating connections among museums to let them serve as social and educational institutes on the basis of their network, surveys and studies were carried out. More specifically, as fundamental information for constructing a network, basic attributes (formal name, address, field, etc.)of 4,000 museums across the nation were surveyed and collected. Referring to them, the museum MARC was created for those concerned with museums, schools, institutes and so forth.

TITLE	Constructing a database of central ministries' reports concerning electronic computers
CONSIGNED COMPANY	Catena Co.
CONTENTS	Using a report written by Computer Utilization Technology Office (a division of MITI agency of Industrial Science and Technology) as a original material, the enterprise is creating secondary information through the work of "Arrangement of bibliographical items", "Creating summarized information", "Selection of keywords in original report" and "Setting technical element keywords for users. " Databases constructed on personal computers will be used with specified software.

FIELD: Activation of the Local Area and Promotion of Minor Enterprises

TITLE	Constructing a database of cultural information on the Okinawa area
CONSIGNED COMPANY	Okinawa Information and Communication Corporation
CONTENTS	One of our aims to put Okinawa's culture in a database for supply of information throughout Japan to increase visitors to Okinawa Prefecture. As a database form, 500 screens were made as retrieval type, NAPLPS system database.The system can be used for networking by a central computer as well as a stand-alone personal computer. Also, multimedia functions displayable on other plural media will be used.

TITLE	Investigation and study concerning the construction of personnel information database of the Kyushu area
CONSIGNED COMPANY	Kyushu Industrial Technology Center
CONTENTS	The survey research group is confirming the needs of local areas for personnel databases required for the development of research and technology, and is preparing to be able to offer advice concerning desirable personnel database and its operation system by defining the contents and origin of the information.

TITLE	Constructing a database of the Takaoka City commercial area
CONSIGNED COMPANY	Takaoka Information Service
CONTENTS	Takaoka Information Service has the objective of constructing a database for overall customer control for use at individual shops and shopping centers by combining individual data (name, address, age, hobby and so forth) including purchasing data.

FIELD: The Revitalization of Local Areas, Promotion of Small and Medium-sized Businesses

TITLE	The construction of databases comprising information concerning local products, human resources and culture, together with investigation and research into the promotion of interchanges between local areas
CONSIGNED COMPANY	Japan Association for City Administration
CONTENTS	This investigation will consist of the following: (1) the construction of a "database comprising information regarding local products, human resources and culture (e.g., Yamagata Prefecture cherries, Yamanashi Prefecture white peaches), as well as a database comprising information regarding local activities, traditional culture, and newly promoted artistic activities." (2) Investigation and research on new directions for networking of information regarding local products and human exchanges for the revitalization of local areas.

FIELD: Map

TITLE	Investigation and research into the construction of a multimedia-type map database
CONSIGNED COMPANY	Japan Institute of Synthetic Technology
CONTENTS	Currently, the so-called "multimedia-type" map databases, that is those which can deal with a variety of forms of information, such as numeral data, characters, graphics and images are required. In our investigation and research, two aims were set as immediate targets in the construction of a multimedia-type map database and have been achieved. These are (1) an analysis of users' needs in work involving the use of maps, and (2) consideration of a data model for multimedia databases.

FIELD: Energy, Resources

TITLE	Construction of a database on combustion technologies and combustion equipment design
CONSIGNED COMPANY	The Japan Society of Mechanical Engineers
CONTENTS	This research aims to integrate technologies related to combustion engineering, including physics and chemistry, fuels, combustion methods, and to gather information regarding combustion fundamentals and combustion equipment design so as to construct a database. This database will be used not only by elementary combustion engineers and researchers, but also by experienced combustion engineers and researchers for the design, trial manufacture and research on combustion equipment. This database is designed to aid trial manufacture of prototypes for a relational database which can simultaneously deal with texts, figures, tables and expressions, and, based on this prototype, the creation of a database. Work is on this current underway.

FIELD: Parts, Technology

TITLE	Construction of an industrial machine-parts database for technology aid systems
CONSIGNED COMPANY	Meitec Corporation
CONTENTS	When choosing the optimum parts, various technological calculations are required according to the use and application conditions. This database is being constructed with the aim of not only gathering product data (outside dimension, specification, etc.) concerning various parts made by different manufacturers, but also of providing reference information by gathering information concerning application and design characteristics. Also, by converting design-related technological calculations and automatic optimum parts selection procedures into application software, the database aims to greatly reduce extra work by designers, and to equalize the level of design work.

FIELD: Parts, Materials

TITLE	Construction of database on programmable peripheral devices for microcomputers
CONSIGNED COMPANY	Japan System House Association
CONTENTS	This database allows even inexperienced engineers to easily develop a database for programmable peripheral devices. The database will incorporate manual contents and also expertise concerning application of devices. Target devices are to be chosen according to their necessity for developing general microcomputer systems.

FIELD: Standardization

TITLE	Construction of database on ion chromatography
CONSIGNED COMPANY	The Science News
CONTENTS	The major characteristics of ion chromatography database are: (1) editing and accomodating of large areas of analysis data, providing high reliability and ease of usage; (2) the data to be gathered will be original data collected by each manufacturer, and not quoted in the literature, etc.; (3) analytical data are to be gathered, edited, evaluated and decided on by a database editing subcommittee of the ion chromatograpy research group; (4) the database can simultaneously display chromatogram and analysis conditions; (5) data will be retrievable according to the element periodic table. Also, symbols for elements, groups, atomic numbers, monoatomic ions, and polyatomic ions etc., can be retrieved. Although those are the most fundamental retrieval keywords, overseas usage is also being taken into account. This database will also accommodate standardized analysis data so that it can contribute to the enhancement of the technical qualifications of the analysis engineers using this database.

TITLE	Investigation of CD-ROM multimedia data format
CONSIGNED COMPANY	Japan Electric Publishing Association
CONTENTS	This year, multimedia information for recording on CD-ROM was divided into text systems, voice/image systems, and database systems, and trends in private and personal standardization in each area were investigated. By stipulating a guideline for CD-ROM electronic publishing standardization for multimedia based on this year's investigation, it is hoped that a basis for the expansion of electronic publishing application areas and markets will be achieved.

FIELD: Overseas

TITLE	Investigation and research into terminology for database construction
CONSIGNED COMPANY	INS Corporation
CONTENTS	This investigation and research aims to provide basic data regarding terminology for state-of-the-art technologies such as databases, machine translation, and artificial intelligence, by grasping the present state of terminology standardization among various academic and industrial organizations. The results of the investigation will be used as the basis for a "database of dictionaries and glossaries of terminology," as well as for data for discussion of the construction of a terminology database providing richer terminology information.

FIELD: Technology

TITLE	Research and investigation on synthetic processing technology for databases consisting of heterogenous data
CONSIGNED COMPANY	Resource Sharing Company
CONTENTS	When creating the architecture for such "sophisticated uses for databases", the following primary technologies are required: (1) technology allowing the accumulation and retrieval of the diversified data in a database (2) technology allowing synthetic use of the diversified data in a database. This project seeks to realize such high-level use of databases on personal computers. In pursuing this aim, the various forms for expressing numerical information, character information, text information, image information and voice information, as well as various forms for accumulating information on magnetic and optical disks, are being investigated and preliminary designs undertaken, so as to allow heterogenous data to be flexibly combined for use.

TITLE	Development of a state-of-the-art document retrieval system based on a binary model
CONSIGNED COMPANY	Sharp Corporation
CONTENTS	By introducing a completely new concept (keyword chain text) into the basic theory of document retrieval systems, STDB (Set Theory Data Base), a system which allows information related to the original information to be easily retrieved using a document keyword, has been developed. The binary model is one of the types which has been attracting much attention among conceptual models. Using menu management, which is a screen for specifying a document file group, and by using a file representing the meaning and the relationship of the keywords as documents, the system is simplified. This makes STDB a simpler and more user-friendly system, integrating document and menu.

As a part of events in Information Month of October, every year, the result presentation and dissemination meeting is held on consigned subjects of the previous year.

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